

## SEQUENCE LISTING

&lt;110&gt; Kovacs, et al.

<120> Identification of a region of the major surface  
glycoprotein (MSG) gene of human Pneumocystis carinii

&lt;130&gt; 53232

&lt;140&gt;

&lt;141&gt;

&lt;160&gt; 26

&lt;170&gt; PatentIn Ver. 2.0

&lt;210&gt; 1

&lt;211&gt; 3042

&lt;212&gt; DNA

&lt;213&gt; Pneumocystis carinii sp. f. hominis

&lt;220&gt;

&lt;221&gt; CDS

&lt;222&gt; (1)..(3042)

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Asp Asp Lys Lys Cys Glu Glu Lys Leu Glu Lys His Cys Lys Glu Leu	
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Phe Cys Asp Ser Lys Lys Arg Asp Lys Lys Cys Lys Glu Leu Lys Lys	
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Asn Val Glu Lys Lys Cys Gly Asp Phe Lys Thr Glu Leu Glu Glu Leu	
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Thr Thr Gln Arg Thr Asn Lys Glu Lys Cys Lys Lys Ile Leu Glu Asp	
325 330 335	
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Lys Cys Lys Asn Leu Lys Glu His Asp Ile Ile Lys Gly Leu Cys Glu	
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Met Tyr Leu Lys Glu Lys Cys Asn Glu Trp Ser Arg Arg Arg Asn Glu	
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Ser Glu Ala Asn Leu	Thr Pro Glu Gln	Val His Glu Lys	Leu Lys Asp	
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Phe Cys Asp Ser Lys	Lys Arg Asp Lys	Lys Cys Lys Glu	Leu Lys Lys	
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85

90

95

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&lt;210&gt; 3

&lt;211&gt; 3006

&lt;212&gt; DNA

<213> *Pneumocystis carinii* sp. f. *hominis*

&lt;220&gt;



&lt;221&gt; CDS

&lt;222&gt; (1)..(3006)

&lt;400&gt; 3

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Asn	Leu	Val	Tyr 260	Ala	Ala	Pro	Gly	Ser 265	His	Phe	Asp	Pro	Thr	Lys	Leu	
aag	att	agg	tta	gca	gaa	gaa	ata	gac	cta	gaa	aaa	ttg	tac	gta	gaa	864
Lys	Ile	Arg 275	Leu	Ala	Glu	Glu	Ile 280	Asp	Leu	Glu	Lys	Leu	Tyr	Val	Glu	
gca	gtg	aaa	aag	gga	att	cat	att	gga	agg	cca	tca	ata	aaa	gat	gaa	912
Ala	Val 290	Lys	Lys	Gly	Ile	His 295	Ile	Gly	Arg	Pro	Ser	Ile	Lys	Asp	Glu	
gtc	gct	tta	ttg	gca	tta	tta	agc	aag	agt	gat	gct	caa	aat	act	ttt	960
Val	Ala	Leu	Leu	Ala	Leu	Leu	Ser	Lys	Ser	Asp 315	Ala	Gln	Asn	Thr	Phe 320	
aaa	gat	caa	tgt	gaa	gat	gtt	att	aaa	aaa	aaa	tgt	gga	aac	ttt	aaa	1008
Lys	Asp	Gln	Cys	Glu 325	Asp	Val	Ile	Lys	Lys	Lys	Cys	Gly	Asn	Phe 335	Lys	
gag	cat	att	att	tta	aaa	gat	tta	tgt	agt	aat	aag	act	atc	act	gat	1056
Glu	His	Ile	Ile	Leu	Lys	Asp	Leu	Cys 345	Ser	Asn	Lys	Thr	Ile	Thr	Asp 350	
aat	cca	aaa	gaa	aaa	tgc	gaa	gaa	cta	aat	aag	gag	tta	aca	acc	cgt	1104
Asn	Pro	Lys 355	Glu	Lys	Cys	Glu	Glu 360	Leu	Asn	Lys	Glu	Leu	Thr	Thr	Arg	
att	tta	act	gtt	tct	aaa	agg	att	gag	aaa	tat	ttc	gct	cca	gct	aat	1152
Ile	Leu	Thr	Val	Ser	Lys	Arg 375	Ile	Glu	Lys	Tyr	Phe 380	Ala	Pro	Ala	Asn	
gta	aag	gaa	att	att	ggt	tgg	cat	atg	ttg	cat	aca	ttt	ctt	ggt	gaa	1200
Val	Lys	Glu	Ile	Ile	Gly	Trp	His	Met	Leu	His 395	Thr	Phe	Leu	Gly	Glu 400	
aga	gag	tgt	acg	aaa	ctg	ttg	tcg	gat	tgt	ttt	tat	ttg	aaa	agc	caa	1248
Arg	Glu	Cys	Thr	Lys	Leu	Leu	Ser	Asp	Cys 410	Phe	Tyr	Leu	Lys	Ser	Gln 415	
gct	cca	ctt	gaa	aag	ccc	tgc	aat	aac	tta	aaa	gca	gca	tgt	tat	aaa	1296
Ala	Pro	Leu	Glu	Lys	Pro	Cys	Asn	Asn	Leu	Lys	Ala	Ala	Cys	Tyr	Lys 430	
aaa	ggg	ctt	gaa	gca	gta	gca	aat	gaa	gca	tta	caa	gat	aag	tta	cgg	1344
Lys	Gly	Leu	Glu	Ala	Val	Ala	Asn	Glu	Ala	Leu	Gln	Asp	Lys	Leu	Arg	
gga	aaa	ttg	caa	ggt	tca	aat	aga	aca	tgg	ctt	gaa	acc	ctt	caa	aaa	1392
Gly	Lys	Leu	Gln	Gly	Ser	Asn	Arg	Thr	Trp	Leu	Glu	Thr	Leu	Gln	Lys 460	
aac	ttg	gta	aaa	gtt	tgt	gaa	aag	acg	aaa	gga	gaa	agt	gat	gaa	tta	1440
Asn	Leu	Val	Lys	Val	Cys	Glu	Lys	Thr	Lys	Gly	Glu	Ser	Asp	Glu	Leu	



465	470	475	480	
ttt gta cta tgt atg aac cca ata aaa acg gct ctt aca gtg tca aca				1488
Phe Val Leu Cys Met Asn Pro Ile Lys Thr Ala Leu Thr Val Ser Thr	485	490	495	
gat ttg cga atg agg gca gtt gct ttg caa gag cat ttg aac gaa aaa				1536
Asp Leu Arg Met Arg Ala Val Ala Leu Gln Glu His Leu Asn Glu Lys	500	505	510	
cga gat ttt cca aca gaa aag gat tgt aaa gaa tta gag aaa aaa tgt				1584
Arg Asp Phe Pro Thr Glu Lys Asp Cys Lys Glu Leu Glu Lys Lys Cys	515	520	525	
gag gtc tta gga aaa gat tca aga gaa att aaa tgg tca tgt tat acg				1632
Glu Val Leu Gly Lys Asp Ser Arg Glu Ile Lys Trp Ser Cys Tyr Thr	530	535	540	
tta aaa cag cat tgc aat cgg ctg aag agc ata gag cac tta gaa gag				1680
Leu Lys Gln His Cys Asn Arg Leu Lys Ser Ile Glu His Leu Glu Glu	545	550	555	560
gag ttg cta aaa gaa aat aaa gga tat tta aaa gat gaa aat agc tgc				1728
Glu Leu Leu Lys Glu Asn Lys Gly Tyr Leu Lys Asp Glu Asn Ser Cys	565	570	575	
aaa gaa gaa gct aag aaa cga tgt gaa aaa tgg ttt aga aga gaa aat				1776
Lys Glu Glu Ala Lys Lys Arg Cys Glu Lys Trp Phe Arg Arg Glu Asn	580	585	590	
aat aaa ttt ttt tgc gct tgt tct gac ttg gaa ctt gtt tgc aaa aag				1824
Asn Lys Phe Phe Ser Ala Cys Ser Asp Leu Glu Leu Val Cys Lys Lys	595	600	605	
atc act aga aat gtt gaa tct aaa tgt aat ata ttg aaa gga cat atg				1872
Ile Thr Arg Asn Val Glu Ser Lys Cys Asn Ile Leu Lys Gly His Met	610	615	620	
gaa act atg aac gtt ata agt gaa ata gct aaa aaa gag gaa aaa ata				1920
Glu Thr Met Asn Val Ile Ser Glu Ile Ala Lys Lys Glu Glu Lys Ile	625	630	635	640
tgt gaa ttt tgg gct cca tat tgt aaa aag tac gag caa aat tgt gaa				1968
Cys Glu Phe Trp Ala Pro Tyr Cys Lys Lys Tyr Glu Gln Asn Cys Glu	645	650	655	
aaa ctt aaa aac gga gga aaa gat ggg caa tgc aaa aaa ctc aat aaa				2016
Lys Leu Lys Asn Gly Gly Lys Asp Gly Gln Cys Lys Lys Leu Asn Lys	660	665	670	
aag tgc aaa tca ttc ctt gaa aaa gaa gct tta gaa aat aaa gtt gta				2064
Lys Cys Lys Ser Phe Leu Glu Lys Glu Ala Leu Glu Asn Lys Val Val	675	680	685	
gaa gaa ttg aaa ggt agt tta tca aac gta gga gaa tgt aac aat aca				2112
Glu Glu Leu Lys Gly Ser Leu Ser Asn Val Gly Cys Asn Asn Thr	690	695	700	
ctt aat ata tac tgt aca caa ttg aaa aag gca gag aat ggg ttg gaa				2160
Leu Asn Ile Tyr Cys Thr Gln Leu Lys Lys Ala Glu Asn Gly Leu Glu	705	710	715	720



act ttg tgc aaa agc aaa gaa aac acc aag agt gac att aaa gtt aga	2208
Thr Leu Cys Lys Ser Lys Glu Asn Thr Lys Ser Asp Ile Lys Val Arg	
725 730 735	
gaa gaa ctc tgt gaa aag cta ata aaa cgt ata aaa gaa aaa tgc tca	2256
Glu Glu Leu Cys Glu Lys Leu Ile Lys Arg Ile Lys Glu Lys Cys Ser	
740 745 750	
aaa ttg aag gac gag ctt gaa gaa gta aaa gag gtc tta gaa aag aaa	2304
Lys Leu Lys Asp Glu Leu Glu Glu Val Lys Glu Val Leu Glu Lys Lys	
755 760 765	
gaa gaa aag tat aaa aaa att aaa gaa gaa gca gaa aaa gcc atg gaa	2352
Glu Glu Lys Tyr Lys Lys Ile Lys Glu Glu Ala Glu Lys Ala Met Glu	
770 775 780	
gat gca aac ctt att tta tcg aga gcg aaa gga cct gat aat aat aat	2400
Asp Ala Asn Leu Ile Leu Ser Arg Ala Lys Gly Pro Asp Asn Asn Asn	
785 790 795 800	
aat aag tca gta aat aaa gac tca tct gat aca cct aag gaa gga aaa	2448
Asn Lys Ser Val Asn Lys Asp Ser Ser Asp Thr Pro Lys Glu Gly Lys	
805 810 815	
ggc aca aca gga ttt aaa ctt gta aga aga aat gca aaa gtg cat gta	2496
Gly Thr Thr Gly Phe Lys Leu Val Arg Arg Asn Ala Lys Val His Val	
820 825 830	
aca gaa aaa gaa tta gca gca ttt gat ttg gta gca aga gca ttt gat	2544
Thr Glu Lys Glu Leu Ala Ala Phe Asp Leu Val Ala Arg Ala Phe Asp	
835 840 845	
ctc tat cta gaa ttg aaa gaa ata tgt aat cat tca ctg aag aat tgt	2592
Leu Tyr Leu Glu Leu Lys Glu Ile Cys Asn His Ser Leu Lys Asn Cys	
850 855 860	
ggt ttc aaa aaa gag tgt gac tgt gag gat cca tgt aaa aag ata cag	2640
Gly Phe Lys Lys Glu Cys Asp Cys Glu Asp Pro Cys Lys Lys Ile Gln	
865 870 875 880	
gga ata tgt tca aca tta gag cca cta aaa gtg aga cca cac gaa ata	2688
Gly Ile Cys Ser Thr Leu Glu Pro Leu Lys Val Arg Pro His Glu Ile	
885 890 895	
gta act aaa aac ata aca act aca acc aca acc acc acc aca act acc	2736
Val Thr Lys Asn Ile Thr Thr Thr Thr Thr Thr Thr Thr Thr Thr	
900 905 910	
att aaa gac gca aag gca aca gac tgc cac tct tta cag aca aca gat	2784
Ile Lys Asp Ala Lys Ala Thr Asp Cys His Ser Leu Gln Thr Thr Asp	
915 920 925	
acg tgg gtc aca aag acg tcg acc cat act agc aca tcc aca acc aca	2832
Thr Trp Val Thr Lys Thr Ser Thr His Thr Ser Thr Ser Thr Thr Thr	
930 935 940	
tct aca gtc acg tca aga ata acg ttg acc tcg aca aga cgg tgt aag	2880
Ser Thr Val Thr Ser Arg Ile Thr Leu Thr Ser Thr Arg Arg Cys Lys	
945 950 955 960	



cct acg aag tgt acg aca gga gag gaa gat gaa gca gga gac gtg aaa 2928  
 Pro Thr Lys Cys Thr Thr Gly Glu Glu Asp Glu Ala Gly Asp Val Lys  
                   965                                  970                                  975

ccg agt gaa ggg ttg agg atg agt gga tgg agt gtg atg agg ggg gtg 2976  
 Pro Ser Glu Gly Leu Arg Met Ser Gly Trp Ser Val Met Arg Gly Val  
                   980                                  985                                  990

tta tta gca atg acg att tca ttc atg att 3006  
 Leu Leu Ala Met Thr Ile Ser Phe Met Ile  
                   995                                  1000

&lt;210&gt; 4

&lt;211&gt; 1002

&lt;212&gt; PRT

<213> *Pneumocystis carinii* sp. f. *hominis*

&lt;400&gt; 4

Val Ala Arg Ala Val Lys Arg Arg Ala Ala Ala Gln Asn Ser Val Glu  
   1                  5                                  10                                  15

Glu Glu Tyr Leu Leu Ala Leu Ile Leu Glu Asn Glu Tyr Glu Asn Asn  
                   20                                  25                                  30

Asp Lys Cys Lys Lys Arg Leu Lys Glu Tyr Cys Glu Val Leu Lys Asn  
                   35                                  40                                  45

Val Thr Lys Glu Pro Lys Lys Leu Glu Glu Lys Leu Asp Gly Ile Cys  
   50                                  55                                  60

Lys Asp Asp Lys Thr Ile Glu Ala Lys Cys Lys Glu Ser Glu Thr Lys  
   65                                  70                                  75                                  80

Val Lys Ala Lys Cys Thr Ser Phe Gln Thr Glu Leu Asp Lys Ala Val  
                   85                                  90                                  95

Lys Lys Gly Ala Ser Thr Leu Glu Asp Asn Asp Cys Lys Lys Asn Glu  
                   100                                  105                                  110

Arg Gln Cys Leu Phe Leu Glu Gly Ala Cys Pro Thr Glu Leu Lys Asp  
                   115                                  120                                  125

Lys Cys Asn Glu Leu Arg Asn Lys Cys Tyr Gln Lys Lys Arg Asp Asp  
   130                                  135                                  140

Val Ala Glu Lys Ala Leu Leu Arg Val Leu Arg Gly Asn Leu Lys Asp  
   145                                  150                                  155                                  160

Lys Asn Thr Cys Lys Asn Lys Leu Lys Gly Val Cys Gln Glu Phe Asn  
                   165                                  170                                  175

Lys Glu Ser Asp Glu Leu Ile Lys Leu Cys Leu Asp Glu Glu Lys Thr  
                   180                                  185                                  190

Cys Gly Asp Leu Val Ser Lys Lys Glu Tyr Lys Cys Lys Pro Leu Lys  
                   195                                  200                                  205

Glu Gly Ile Asp Leu Val Leu Gly Lys Glu Asp Leu Leu Lys Glu Lys  
   210                                  215                                  220



Cys Leu Leu Phe Leu Glu Glu Cys Tyr Phe Tyr Gly Ser Asn Cys Glu  
 225 230 235 240  
 Thr Asp Gln Pro Lys Cys Lys Glu Phe Ala Ser Lys Cys Gln Lys Glu  
 245 250 255  
 Asn Leu Val Tyr Ala Ala Pro Gly Ser His Phe Asp Pro Thr Lys Leu  
 260 265 270  
 Lys Ile Arg Leu Ala Glu Glu Ile Asp Leu Glu Lys Leu Tyr Val Glu  
 275 280 285  
 Ala Val Lys Lys Gly Ile His Ile Gly Arg Pro Ser Ile Lys Asp Glu  
 290 295 300  
 Val Ala Leu Leu Ala Leu Leu Ser Lys Ser Asp Ala Gln Asn Thr Phe  
 305 310 315 320  
 Lys Asp Gln Cys Glu Asp Val Ile Lys Lys Lys Cys Gly Asn Phe Lys  
 325 330 335  
 Glu His Ile Ile Leu Lys Asp Leu Cys Ser Asn Lys Thr Ile Thr Asp  
 340 345 350  
 Asn Pro Lys Glu Lys Cys Glu Glu Leu Asn Lys Glu Leu Thr Thr Arg  
 355 360 365  
 Ile Leu Thr Val Ser Lys Arg Ile Glu Lys Tyr Phe Ala Pro Ala Asn  
 370 375 380  
 Val Lys Glu Ile Ile Gly Trp His Met Leu His Thr Phe Leu Gly Glu  
 385 390 395 400  
 Arg Glu Cys Thr Lys Leu Leu Ser Asp Cys Phe Tyr Leu Lys Ser Gln  
 405 410 415  
 Ala Pro Leu Glu Lys Pro Cys Asn Asn Leu Lys Ala Ala Cys Tyr Lys  
 420 425 430  
 Lys Gly Leu Glu Ala Val Ala Asn Glu Ala Leu Gln Asp Lys Leu Arg  
 435 440 445  
 Gly Lys Leu Gln Gly Ser Asn Arg Thr Trp Leu Glu Thr Leu Gln Lys  
 450 455 460  
 Asn Leu Val Lys Val Cys Glu Lys Thr Lys Gly Glu Ser Asp Glu Leu  
 465 470 475 480  
 Phe Val Leu Cys Met Asn Pro Ile Lys Thr Ala Leu Thr Val Ser Thr  
 485 490 495  
 Asp Leu Arg Met Arg Ala Val Ala Leu Gln Glu His Leu Asn Glu Lys  
 500 505 510  
 Arg Asp Phe Pro Thr Glu Lys Asp Cys Lys Glu Leu Glu Lys Lys Cys  
 515 520 525  
 Glu Val Leu Gly Lys Asp Ser Arg Glu Ile Lys Trp Ser Cys Tyr Thr  
 530 535 540  
 Leu Lys Gln His Cys Asn Arg Leu Lys Ser Ile Glu His Leu Glu Glu



545		550		555		560
Glu Leu Leu Lys	Glu Asn Lys Gly Tyr Leu Lys Asp Glu Asn Ser Cys					
	565			570		575
Lys Glu Glu Ala Lys Lys Arg Cys Glu Lys Trp Phe Arg Arg Glu Asn						
	580			585		590
Asn Lys Phe Phe Ser Ala Cys Ser Asp Leu Glu Leu Val Cys Lys Lys						
	595			600		605
Ile Thr Arg Asn Val Glu Ser Lys Cys Asn Ile Leu Lys Gly His Met						
	610			615		620
Glu Thr Met Asn Val Ile Ser Glu Ile Ala Lys Lys Glu Glu Lys Ile						
	625			630		640
Cys Glu Phe Trp Ala Pro Tyr Cys Lys Lys Tyr Glu Gln Asn Cys Glu						
	645			650		655
Lys Leu Lys Asn Gly Gly Lys Asp Gly Gln Cys Lys Lys Leu Asn Lys						
	660			665		670
Lys Cys Lys Ser Phe Leu Glu Lys Glu Ala Leu Glu Asn Lys Val Val						
	675			680		685
Glu Glu Leu Lys Gly Ser Leu Ser Asn Val Gly Glu Cys Asn Asn Thr						
	690			695		700
Leu Asn Ile Tyr Cys Thr Gln Leu Lys Lys Ala Glu Asn Gly Leu Glu						
	705			710		720
Thr Leu Cys Lys Ser Lys Glu Asn Thr Lys Ser Asp Ile Lys Val Arg						
	725			730		735
Glu Glu Leu Cys Glu Lys Leu Ile Lys Arg Ile Lys Glu Lys Cys Ser						
	740			745		750
Lys Leu Lys Asp Glu Leu Glu Glu Val Lys Glu Val Leu Glu Lys Lys						
	755			760		765
Glu Glu Lys Tyr Lys Lys Ile Lys Glu Glu Ala Glu Lys Ala Met Glu						
	770			775		780
Asp Ala Asn Leu Ile Leu Ser Arg Ala Lys Gly Pro Asp Asn Asn Asn						
	785			790		800
Asn Lys Ser Val Asn Lys Asp Ser Ser Asp Thr Pro Lys Glu Gly Lys						
	805			810		815
Gly Thr Thr Gly Phe Lys Leu Val Arg Arg Asn Ala Lys Val His Val						
	820			825		830
Thr Glu Lys Glu Leu Ala Ala Phe Asp Leu Val Ala Arg Ala Phe Asp						
	835			840		845
Leu Tyr Leu Glu Leu Lys Glu Ile Cys Asn His Ser Leu Lys Asn Cys						
	850			855		860
Gly Phe Lys Lys Glu Cys Asp Cys Glu Asp Pro Cys Lys Lys Ile Gln						
	865			870		880



Gly Ile Cys Ser Thr Leu Glu Pro Leu Lys Val Arg Pro His Glu Ile  
885 890 895

Val Thr Lys Asn Ile Thr Thr Thr Thr Thr Thr Thr Thr Thr  
900 905 910

Ile Lys Asp Ala Lys Ala Thr Asp Cys His Ser Leu Gln Thr Thr Asp  
915 920 925

Thr Trp Val Thr Lys Thr Ser Thr His Thr Ser Thr Ser Thr Thr Thr  
930 935 940

Ser Thr Val Thr Ser Arg Ile Thr Leu Thr Ser Thr Arg Arg Cys Lys  
945 950 955 960

Pro Thr Lys Cys Thr Thr Gly Glu Glu Asp Glu Ala Gly Asp Val Lys  
965 970 975

Pro Ser Glu Gly Leu Arg Met Ser Gly Trp Ser Val Met Arg Gly Val  
980 985 990

Leu Leu Ala Met Thr Ile Ser Phe Met Ile  
995 1000

&lt;210&gt; 5

&lt;211&gt; 3090

&lt;212&gt; DNA

<213> *Pneumocystis carinii* sp. f. *hominis*

&lt;220&gt;

&lt;221&gt; CDS

&lt;222&gt; (1)..(3090)

&lt;400&gt; 5

atg gcg cgg gcg gtc aag cgg cgg gca aaa ggt gca cag aat agc att	48
Met Ala Arg Ala Val Lys Arg Arg Ala Lys Gly Ala Gln Asn Ser Ile	
1 5 10 15	
gat gag gag cat gtt tta gct ttg att tta aaa aaa aat gga tta gaa	96
Asp Glu Glu His Val Leu Ala Leu Ile Leu Lys Lys Asn Gly Leu Glu	
20 25 30	
gat aca aaa tgc aaa act aag ttg gaa gaa tat tgc aaa aca tta aca	144
Asp Thr Lys Cys Lys Thr Lys Leu Glu Glu Tyr Cys Lys Thr Leu Thr	
35 40 45	
aat gca gga tta aat cca gaa aaa gtt cac gaa aaa tta aaa gat ttc	192
Asn Ala Gly Leu Asn Pro Glu Lys Val His Glu Lys Leu Lys Asp Phe	
50 55 60	
tgt gat aac ggg aaa cga aat gaa aaa tgt caa gat cta aaa aac aaa	240
Cys Asp Asn Gly Lys Arg Asn Glu Lys Cys Gln Asp Leu Lys Asn Lys	
65 70 75 80	
gtc aat caa aaa tgc att aaa ttt caa gga aaa ctt caa aca gct gct	288
Val Asn Gln Lys Cys Ile Lys Phe Gln Gly Lys Leu Gln Thr Ala Ala	
85 90 95	
gga aaa aaa att tca gaa tta aca gat gag gat tgc aaa aag aat gaa	336



Gly	Lys	Lys	Ile	Ser	Glu	Leu	Thr	Asp	Glu	Asp	Cys	Lys	Lys	Asn	Glu	
			100					105						110		
caa	caa	tgc	cta	ttt	ttg	gag	gga	gca	tgt	cca	aca	gaa	ctt	aaa	gat	384
Gln	Gln	Cys	Leu	Phe	Leu	Glu	Gly	Ala	Cys	Pro	Thr	Glu	Leu	Lys	Asp	
		115					120					125				
gac	tgc	aat	aaa	tta	agg	aat	aac	tgt	tat	caa	aaa	gaa	cgg	aac	aat	432
Asp	Cys	Asn	Lys	Leu	Arg	Asn	Asn	Cys	Tyr	Gln	Lys	Glu	Arg	Asn	Asn	
		130				135					140					
gtg	gca	gaa	gaa	gtt	ctt	ttg	agg	gcg	ctt	cgt	ggg	gat	ctc	aat	gaa	480
Val	Ala	Glu	Glu	Val	Leu	Leu	Arg	Ala	Leu	Arg	Gly	Asp	Leu	Asn	Glu	
145					150					155					160	
aca	aag	aca	tgt	gaa	aaa	aag	ctg	aaa	gaa	gtt	tgc	ccg	aaa	tta	gaa	528
Thr	Lys	Thr	Cys	Glu	Lys	Lys	Leu	Lys	Glu	Val	Cys	Pro	Lys	Leu	Glu	
				165					170					175		
aga	gaa	agc	gat	gaa	tta	acg	gag	ctt	tgt	ctt	tat	caa	aaa	aca	aca	576
Arg	Glu	Ser	Asp	Glu	Leu	Thr	Glu	Leu	Cys	Leu	Tyr	Gln	Lys	Thr	Thr	
			180					185					190			
tgc	gta	agt	ctt	gta	aca	aaa	gga	aaa	agt	aaa	tgt	gat	act	ctt	gaa	624
Cys	Val	Ser	Leu	Val	Thr	Lys	Gly	Lys	Ser	Lys	Cys	Asp	Thr	Leu	Glu	
		195					200					205				
aaa	gaa	gtt	gaa	gaa	gca	ctt	aag	aag	aat	gaa	ttg	cga	gaa	aaa	tgt	672
Lys	Glu	Val	Glu	Glu	Ala	Leu	Lys	Lys	Asn	Glu	Leu	Arg	Glu	Lys	Cys	
		210				215					220					
cta	cta	tta	ctt	gag	caa	tgt	tac	ttt	cac	aga	ggg	aac	tgt	gaa	gga	720
Leu	Leu	Leu	Leu	Glu	Gln	Cys	Tyr	Phe	His	Arg	Gly	Asn	Cys	Glu	Gly	
225					230					235					240	
gac	aaa	tca	aag	tgc	aat	aaa	cct	aat	aat	aaa	gac	tgc	aaa	gaa	tat	768
Asp	Lys	Ser	Lys	Cys	Asn	Lys	Pro	Asn	Asn	Lys	Asp	Cys	Lys	Glu	Tyr	
				245				250						255		
gta	cca	gag	tgt	gat	gaa	tta	gca	gaa	aag	tgt	gga	aaa	gaa	aat	att	816
Val	Pro	Glu	Cys	Asp	Glu	Leu	Ala	Glu	Lys	Cys	Gly	Lys	Glu	Asn	Ile	
			260					265					270			
gtt	tat	atg	cat	cca	gga	tcc	gat	ttc	gat	cca	act	aag	cca	gag	cct	864
Val	Tyr	Met	His	Pro	Gly	Ser	Asp	Phe	Asp	Pro	Thr	Lys	Pro	Glu	Pro	
		275					280					285				
aca	cta	gca	gag	gac	ata	ggg	ctg	gaa	gag	ctt	tat	aag	agg	gca	gaa	912
Thr	Leu	Ala	Glu	Asp	Ile	Gly	Leu	Glu	Glu	Leu	Tyr	Lys	Arg	Ala	Glu	
		290				295					300					
gag	gat	gga	att	ttt	gtt	gga	aga	caa	cat	gta	aga	gat	gca	aca	gct	960
Glu	Asp	Gly	Ile	Phe	Val	Gly	Arg	Gln	His	Val	Arg	Asp	Ala	Thr	Ala	
305					310					315					320	
ttg	ttg	gca	cta	ctt	ctt	aag	aaa	acc	ctt	aaa	aaa	gaa	gaa	tgt	ata	1008
Leu	Leu	Ala	Leu	Leu	Leu	Lys	Lys	Thr	Leu	Lys	Lys	Glu	Glu	Cys	Ile	
				325					330					335		
aaa	gcc	ctt	aaa	aaa	aac	tgc	gaa	aac	cct	cat	gaa	cat	gag	gcc	tta	1056
Lys	Ala	Leu	Lys	Lys	Asn	Cys	Glu	Asn	Pro	His	Glu	His	Glu	Ala	Leu	



340	345	350	
gaa aat cta tgt aag gaa aat aaa cca agt agt gat gga acg aaa aaa Glu Asn Leu Cys Lys Glu Asn Lys Pro Ser Ser Asp Gly Thr Lys Lys 355 360 365			1104
tgt gat gaa cta gaa aaa gat gtt aac aaa act tgt aca agt ctt aca Cys Asp Glu Leu Glu Lys Asp Val Asn Lys Thr Cys Thr Ser Leu Thr 370 375 380			1152
tca aca att ctt aaa aac cgt ctt tac att tca cct gat gga att gcg Ser Thr Ile Leu Lys Asn Arg Leu Tyr Ile Ser Pro Asp Gly Ile Ala 385 390 395 400			1200
gaa tgg gga aaa tta ccg aca ttt ctt agt gat gaa gat tgt gca aaa Glu Trp Gly Lys Leu Pro Thr Phe Leu Ser Asp Glu Asp Cys Ala Lys 405 410 415			1248
cta gaa tct tat tgc ttt tat tat aaa gaa act tgt cca gat gtc aaa Leu Glu Ser Tyr Cys Phe Tyr Tyr Lys Glu Thr Cys Pro Asp Val Lys 420 425 430			1296
gaa gct tgt atg aat gtg agg gca gcg tgt tat aag aga ggg ctt gat Glu Ala Cys Met Asn Val Arg Ala Ala Cys Tyr Lys Arg Gly Leu Asp 435 440 445			1344
gca cgg gca aac agt gtg ttg caa aaa aat atg cga ggg tta ttg cat Ala Arg Ala Asn Ser Val Leu Gln Lys Asn Met Arg Gly Leu Leu His 450 455 460			1392
ggc tca aat aaa gat tgg ctt aag aaa ttt caa caa gaa tta gca aaa Gly Ser Asn Lys Asp Trp Leu Lys Lys Phe Gln Gln Glu Leu Ala Lys 465 470 475 480			1440
gta tgt gag aaa ctg aaa gga aat aaa gga agt ttc tcg aac gat gaa Val Cys Glu Lys Leu Lys Gly Asn Lys Gly Ser Phe Ser Asn Asp Glu 485 490 495			1488
ttg ttt gtt ctg tgt ata caa cca gca aag gca gca cga tta ctt aca Leu Phe Val Leu Cys Ile Gln Pro Ala Lys Ala Ala Arg Leu Leu Thr 500 505 510			1536
cat cac cat caa atg aga gtt atc ttt tta cga caa caa ctg gat caa His His His Gln Met Arg Val Ile Phe Leu Arg Gln Gln Leu Asp Gln 515 520 525			1584
aag aga gat ttt ccg aca gat aaa gac tgc aag gaa tta ggg aga aaa Lys Arg Asp Phe Pro Thr Asp Lys Asp Cys Lys Glu Leu Gly Arg Lys 530 535 540			1632
tgc caa gat tta gga aag gat tca aaa gaa att aca tgg cca tgt cat Cys Gln Asp Leu Gly Lys Asp Ser Lys Glu Ile Thr Trp Pro Cys His 545 550 555 560			1680
aca cta gaa cag caa tgc aat cgc tta ggg att aca gaa att tta aaa Thr Leu Glu Gln Gln Cys Asn Arg Leu Gly Ile Thr Glu Ile Leu Lys 565 570 575			1728
cag att tta ttg gat gaa cac aaa gat act ttg aaa agt cat gaa aac Gln Ile Leu Leu Asp Glu His Lys Asp Thr Leu Lys Ser His Glu Asn 580 585 590			1776



tgt gca aaa tat tta aaa aga aaa tgc cat aaa tgg tct aga agg ggt Cys Ala Lys Tyr Leu Lys Arg Lys Cys His Lys Trp Ser Arg Arg Gly 595 600 605	1824
gat gat cgt ttt tct ttt gta tgt gtt ttc caa aac gct aca tgt gag Asp Asp Arg Phe Ser Phe Val Cys Val Phe Gln Asn Ala Thr Cys Glu 610 615 620	1872
ctg atg gta aaa gac gtg caa gat agg tgc aaa ata ttc gaa gaa aat Leu Met Val Lys Asp Val Gln Asp Arg Cys Lys Ile Phe Glu Glu Asn 625 630 635 640	1920
atg caa gca tca gat att aat gat tcc ctt aaa aaa aat caa ata aaa Met Gln Ala Ser Asp Ile Asn Asp Ser Leu Lys Lys Asn Gln Ile Lys 645 650 655	1968
gca gaa tca gca gca aat att tgt ccc tca tgg cat cca tac tgc gat Ala Glu Ser Ala Ala Asn Ile Cys Pro Ser Trp His Pro Tyr Cys Asp 660 665 670	2016
aga ttt tta ccc aat tgt cct gat ctt aag aaa gga aaa act ttc tgt Arg Phe Leu Pro Asn Cys Pro Asp Leu Lys Lys Gly Lys Thr Phe Cys 675 680 685	2064
caa aat ctt aaa aaa tat tgc gaa cca ttc tac aaa aga aag gtt tta Gln Asn Leu Lys Lys Tyr Cys Glu Pro Phe Tyr Lys Arg Lys Val Leu 690 695 700	2112
gaa gat gct ctt aaa gta gag ctt cga gga aat tta agt aat ata act Glu Asp Ala Leu Lys Val Glu Leu Arg Gly Asn Leu Ser Asn Ile Thr 705 710 715 720	2160
aaa tgt gaa cct gca tta gaa aga tat tgt aca gta ttg aaa gac gta Lys Cys Glu Pro Ala Leu Glu Arg Tyr Cys Thr Val Leu Lys Asp Val 725 730 735	2208
aat aat gcg tca atc agc agt tta tgt aaa gat aat acc gaa agt aaa Asn Asn Ala Ser Ile Ser Ser Leu Cys Lys Asp Asn Thr Glu Ser Lys 740 745 750	2256
act aaa aag gcc gat aat aaa aat gtt aga aag aag ctt tgt cta aaa Thr Lys Lys Ala Asp Asn Lys Asn Val Arg Lys Lys Leu Cys Leu Lys 755 760 765	2304
tta gtg gaa gag gtg gaa cag caa tgc aaa gta tta cca aca gaa tta Leu Val Glu Glu Val Glu Gln Cys Lys Val Leu Pro Thr Glu Leu 770 775 780	2352
aca gag ctg gaa aaa agt cta aaa aaa gat gtt aag aca tat gag gaa Thr Glu Leu Glu Lys Ser Leu Lys Lys Asp Val Lys Thr Tyr Glu Glu 785 790 795 800	2400
ctt aag gaa agg gca aaa aaa gca atg aac aag tcc agc ctt gtt tta Leu Lys Glu Arg Ala Lys Lys Ala Met Asn Lys Ser Ser Leu Val Leu 805 810 815	2448
tca ctt gtt aag aaa aac gaa agt aat aca tcg aaa aat aat agc aaa Ser Leu Val Lys Lys Asn Glu Ser Asn Thr Ser Lys Asn Asn Ser Lys 820 825 830	2496



aac aag gat aag aat gtc gtt tca aac gga ctt caa gat acc aca aaa 2544  
 Asn Lys Asp Lys Asn Val Val Ser Asn Gly Leu Gln Asp Thr Thr Lys  
 835 840 845

tat gtg aaa ata cta cga aga gga gtt aag gag gca ctt gta aca gaa 2592  
 Tyr Val Lys Ile Leu Arg Arg Gly Val Lys Glu Ala Leu Val Thr Glu  
 850 855 860

tct gaa gcc aag gca ttt gat ttg gca gca gaa gtg ttt gga aga tat 2640  
 Ser Glu Ala Lys Ala Phe Asp Leu Ala Ala Glu Val Phe Gly Arg Tyr  
 865 870 875 880

gta gac ttg aaa gaa aaa tgt gag aaa ttg act tcg gat tgc ggg att 2688  
 Val Asp Leu Lys Glu Lys Cys Glu Lys Leu Thr Ser Asp Cys Gly Ile  
 885 890 895

aaa gac gat tgc gat ggt tta aaa gaa gtg tgt gga aag att gag aag 2736  
 Lys Asp Asp Cys Asp Gly Leu Lys Glu Val Cys Gly Lys Ile Glu Lys  
 900 905 910

aca tgt cac gat ctg aag cct ctg gag gtg aag tcg cat gaa ata gtc 2784  
 Thr Cys His Asp Leu Lys Pro Leu Glu Val Lys Ser His Glu Ile Val  
 915 920 925

aca gaa agc aca acg acg acc aca acg aca aca acg acc gtt acc gat 2832  
 Thr Glu Ser Thr Thr Thr Thr Thr Thr Thr Thr Thr Thr Val Thr Asp  
 930 935 940

ccg aag gca aca gaa tgc aaa tcc tta cag aca aca gat aca tgg gtt 2880  
 Pro Lys Ala Thr Glu Cys Lys Ser Leu Gln Thr Thr Asp Thr Trp Val  
 945 950 955 960

aca cag aca tcg aca cac aca agc acg tct acc atc aca tct acc atc 2928  
 Thr Gln Thr Ser Thr His Thr Ser Thr Ser Thr Ile Thr Ser Thr Ile  
 965 970 975

aca tca aaa ata aca ttg aca tca acg agg cga tgc aaa cca acc aag 2976  
 Thr Ser Lys Ile Thr Leu Thr Ser Thr Arg Arg Cys Lys Pro Thr Lys  
 980 985 990

tgt acg aca ggg gat gaa gca gga gac gtg aaa ccg agt gag gga ttg 3024  
 Cys Thr Thr Gly Asp Glu Ala Gly Asp Val Lys Pro Ser Glu Gly Leu  
 995 1000 1005

aag atg agt ggg tgg agc gtg atg agg ggg gtg ata gta gca atg gtt 3072  
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att tcg ttc atg att tag 3090  
 Ile Ser Phe Met Ile  
 1025 1030

&lt;210&gt; 6

&lt;211&gt; 1029

&lt;212&gt; PRT

<213> *Pneumocystis carinii* sp. f. *hominis*

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Asp Glu Glu His Val Leu Ala Leu Ile Leu Lys Lys Asn Gly Leu Glu  
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 Asp Thr Lys Cys Lys Thr Lys Leu Glu Glu Tyr Cys Lys Thr Leu Thr  
                             35                            40                            45  
 Asn Ala Gly Leu Asn Pro Glu Lys Val His Glu Lys Leu Lys Asp Phe  
                             50                            55                            60  
 Cys Asp Asn Gly Lys Arg Asn Glu Lys Cys Gln Asp Leu Lys Asn Lys  
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 Val Asn Gln Lys Cys Ile Lys Phe Gln Gly Lys Leu Gln Thr Ala Ala  
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 Gly Lys Lys Ile Ser Glu Leu Thr Asp Glu Asp Cys Lys Lys Asn Glu  
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 Gln Gln Cys Leu Phe Leu Glu Gly Ala Cys Pro Thr Glu Leu Lys Asp  
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 Asp Cys Asn Lys Leu Arg Asn Asn Cys Tyr Gln Lys Glu Arg Asn Asn  
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 Val Ala Glu Glu Val Leu Leu Arg Ala Leu Arg Gly Asp Leu Asn Glu  
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 Thr Lys Thr Cys Glu Lys Lys Leu Lys Glu Val Cys Pro Lys Leu Glu  
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 Arg Glu Ser Asp Glu Leu Thr Glu Leu Cys Leu Tyr Gln Lys Thr Thr  
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 Cys Val Ser Leu Val Thr Lys Gly Lys Ser Lys Cys Asp Thr Leu Glu  
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 Lys Glu Val Glu Glu Ala Leu Lys Lys Asn Glu Leu Arg Glu Lys Cys  
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 Leu Leu Leu Leu Glu Gln Cys Tyr Phe His Arg Gly Asn Cys Glu Gly  
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 Asp Lys Ser Lys Cys Asn Lys Pro Asn Asn Lys Asp Cys Lys Glu Tyr  
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 Val Pro Glu Cys Asp Glu Leu Ala Glu Lys Cys Gly Lys Glu Asn Ile  
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 Val Tyr Met His Pro Gly Ser Asp Phe Asp Pro Thr Lys Pro Glu Pro  
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 Thr Leu Ala Glu Asp Ile Gly Leu Glu Glu Leu Tyr Lys Arg Ala Glu  
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 Glu Asp Gly Ile Phe Val Gly Arg Gln His Val Arg Asp Ala Thr Ala  
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 Leu Leu Ala Leu Leu Leu Lys Lys Thr Leu Lys Lys Glu Glu Cys Ile  
                             325                            330                            335



Lys Ala Leu Lys Lys Asn Cys Glu Asn Pro His Glu His Glu Ala Leu  
 340 345 350  
 Glu Asn Leu Cys Lys Glu Asn Lys Pro Ser Ser Asp Gly Thr Lys Lys  
 355 360 365  
 Cys Asp Glu Leu Glu Lys Asp Val Asn Lys Thr Cys Thr Ser Leu Thr  
 370 375 380  
 Ser Thr Ile Leu Lys Asn Arg Leu Tyr Ile Ser Pro Asp Gly Ile Ala  
 385 390 395 400  
 Glu Trp Gly Lys Leu Pro Thr Phe Leu Ser Asp Glu Asp Cys Ala Lys  
 405 410 415  
 Leu Glu Ser Tyr Cys Phe Tyr Tyr Lys Glu Thr Cys Pro Asp Val Lys  
 420 425 430  
 Glu Ala Cys Met Asn Val Arg Ala Ala Cys Tyr Lys Arg Gly Leu Asp  
 435 440 445  
 Ala Arg Ala Asn Ser Val Leu Gln Lys Asn Met Arg Gly Leu Leu His  
 450 455 460  
 Gly Ser Asn Lys Asp Trp Leu Lys Lys Phe Gln Gln Glu Leu Ala Lys  
 465 470 475 480  
 Val Cys Glu Lys Leu Lys Gly Asn Lys Gly Ser Phe Ser Asn Asp Glu  
 485 490 495  
 Leu Phe Val Leu Cys Ile Gln Pro Ala Lys Ala Ala Arg Leu Leu Thr  
 500 505 510  
 His His His Gln Met Arg Val Ile Phe Leu Arg Gln Gln Leu Asp Gln  
 515 520 525  
 Lys Arg Asp Phe Pro Thr Asp Lys Asp Cys Lys Glu Leu Gly Arg Lys  
 530 535 540  
 Cys Gln Asp Leu Gly Lys Asp Ser Lys Glu Ile Thr Trp Pro Cys His  
 545 550 555 560  
 Thr Leu Glu Gln Gln Cys Asn Arg Leu Gly Ile Thr Glu Ile Leu Lys  
 565 570 575  
 Gln Ile Leu Leu Asp Glu His Lys Asp Thr Leu Lys Ser His Glu Asn  
 580 585 590  
 Cys Ala Lys Tyr Leu Lys Arg Lys Cys His Lys Trp Ser Arg Arg Gly  
 595 600 605  
 Asp Asp Arg Phe Ser Phe Val Cys Val Phe Gln Asn Ala Thr Cys Glu  
 610 615 620  
 Leu Met Val Lys Asp Val Gln Asp Arg Cys Lys Ile Phe Glu Glu Asn  
 625 630 635 640  
 Met Gln Ala Ser Asp Ile Asn Asp Ser Leu Lys Lys Asn Gln Ile Lys  
 645 650 655  
 Ala Glu Ser Ala Ala Asn Ile Cys Pro Ser Trp His Pro Tyr Cys Asp  
 22



660										665										670											
Arg	Phe	Leu	Pro	Asn	Cys	Pro	Asp	Leu	Lys	Lys	Gly	Lys	Thr	Phe	Cys																
		675						680																							
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Glu	Asp	Ala	Leu	Lys	Val	Glu	Leu	Arg	Gly	Asn	Leu	Ser	Asn	Ile	Thr																
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Lys	Cys	Glu	Pro	Ala	Leu	Glu	Arg	Tyr	Cys	Thr	Val	Leu	Lys	Asp	Val																
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Asn	Lys	Asp	Lys	Asn	Val	Val	Ser	Asn	Gly	Leu	Gln	Asp	Thr	Thr	Lys																
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Tyr	Val	Lys	Ile	Leu	Arg	Arg	Gly	Val	Lys	Glu	Ala	Leu	Val	Thr	Glu																
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Ser	Glu	Ala	Lys	Ala	Phe	Asp	Leu	Ala	Ala	Glu	Val	Phe	Gly	Arg	Tyr																
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Val	Asp	Leu	Lys	Glu	Lys	Cys	Glu	Lys	Leu	Thr	Ser	Asp	Cys	Gly	Ile																
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Lys	Asp	Asp	Cys	Asp	Gly	Leu	Lys	Glu	Val	Cys	Gly	Lys	Ile	Glu	Lys																
			900						905						910																
Thr	Cys	His	Asp	Leu	Lys	Pro	Leu	Glu	Val	Lys	Ser	His	Glu	Ile	Val																
			915						920						925																
Thr	Glu	Ser	Thr	Thr	Thr	Thr	Thr	Thr	Thr	Thr	Thr	Thr	Val	Thr	Asp																
									935						940																
Pro	Lys	Ala	Thr	Glu	Cys	Lys	Ser	Leu	Gln	Thr	Thr	Asp	Thr	Trp	Val																
					950										960																
Thr	Gln	Thr	Ser	Thr	His	Thr	Ser	Thr	Ser	Thr	Ile	Thr	Ser	Thr	Ile																
				965					970						975																
Thr	Ser	Lys	Ile	Thr	Leu	Thr	Ser	Thr	Arg	Arg	Cys	Lys	Pro	Thr	Lys																
			980						985						990																



Cys Thr Thr Gly Asp Glu Ala Gly Asp Val Lys Pro Ser Glu Gly Leu  
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Lys Met Ser Gly Trp Ser Val Met Arg Gly Val Ile Val Ala Met Val  
 1010 1015 1020

Ile Ser Phe Met Ile  
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<211> 3084

<212> DNA

<213> *Pneumocystis carinii* sp. f. hominis

<220>

<221> CDS

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gat gag gag cat gtt tta gct ttg att tta aaa aaa aat gga tta gaa 96  
 Asp Glu Glu His Val Leu Ala Leu Ile Leu Lys Lys Asn Gly Leu Glu  
 20 25 30

gat aca aaa tgc aaa act aag ttg gaa gaa tat tgc aaa aca tta aca 144  
 Asp Thr Lys Cys Lys Thr Lys Leu Glu Glu Tyr Cys Lys Thr Leu Thr  
 35 40 45

aat gca gga tta aat cca gaa aaa gtt cac gaa aaa tta aaa gat ttc 192  
 Asn Ala Gly Leu Asn Pro Glu Lys Val His Glu Lys Leu Lys Asp Phe  
 50 55 60

tgt gat aac ggg aaa cga aat gaa aaa tgt caa gat cta aaa aac aaa 240  
 Cys Asp Asn Gly Lys Arg Asn Glu Lys Cys Gln Asp Leu Lys Asn Lys  
 65 70 75 80

gtc aat caa aaa tgc att aaa ttt caa gga aaa ctt caa aca gct gct 288  
 Val Asn Gln Lys Cys Ile Lys Phe Gln Gly Lys Leu Gln Thr Ala Ala  
 85 90 95

aga aaa aaa att tca gaa tta aca gat gag gat tgc aaa aag aat gaa 336  
 Arg Lys Lys Ile Ser Glu Leu Thr Asp Glu Asp Cys Lys Lys Asn Glu  
 100 105 110

caa caa tgc cta ttt ttg gag gga gca tgt cca aca gaa ctt aaa gat 384  
 Gln Gln Cys Leu Phe Leu Glu Gly Ala Cys Pro Thr Glu Leu Lys Asp  
 115 120 125

gac tgc aat aaa tta agg aat aac tgt tat caa aaa gaa cgg aac aat 432  
 Asp Cys Asn Lys Leu Arg Asn Asn Cys Tyr Gln Lys Glu Arg Asn Asn  
 130 135 140

gtg gca gaa gaa gtt ctt ttg agg gcg ctt cgt ggt gat ctc aat gaa 480  
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 145 150 155 160



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Arg Glu Ser Asp Glu Leu Thr Glu Leu Cys Leu Tyr Gln Lys Thr Thr	
180 185 190	
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Cys Val Ser Leu Val Thr Lys Gly Lys Ser Lys Cys Asp Thr Leu Glu	
195 200 205	
aaa gaa gtt gaa gaa gca ctt aag aag aat gaa ttg cga gaa aaa tgt	672
Lys Glu Val Glu Glu Ala Leu Lys Lys Asn Glu Leu Arg Glu Lys Cys	
210 215 220	
cta cta tta ctt gag caa tgt tac ttt cac aga ggg aac tgt gaa gga	720
Leu Leu Leu Leu Glu Gln Cys Tyr Phe His Arg Gly Asn Cys Glu Gly	
225 230 235 240	
gac aaa tca aag tgc aat aaa cct aat aat aaa gac tgc aaa gaa tat	768
Asp Lys Ser Lys Cys Asn Lys Pro Asn Asn Lys Asp Cys Lys Glu Tyr	
245 250 255	
gta cca gag tgt gat gaa tta gca gaa aag tgt gga aaa gaa aat att	816
Val Pro Glu Cys Asp Glu Leu Ala Glu Lys Cys Gly Lys Glu Asn Ile	
260 265 270	
gtt tat atg cat cca gga tcc gat ttc gat cca act aag cca gag cct	864
Val Tyr Met His Pro Gly Ser Asp Phe Asp Pro Thr Lys Pro Glu Pro	
275 280 285	
aca cta gca gag gac ata ggg ctg gaa gag ctt tat aag agg gca gaa	912
Thr Leu Ala Glu Asp Ile Gly Leu Glu Glu Leu Tyr Lys Arg Ala Glu	
290 295 300	
gag gat gga att ttt gtt gga aga caa cat gta aga gat gca aca gct	960
Glu Asp Gly Ile Phe Val Gly Arg Gln His Val Arg Asp Ala Thr Ala	
305 310 315 320	
ttg ttg gca cta ctt ctt aag aaa acc ctt aaa aaa gaa gaa tgt ata	1008
Leu Leu Ala Leu Leu Leu Lys Lys Thr Leu Lys Lys Glu Glu Cys Ile	
325 330 335	
aaa gcc ctt aaa aaa aac tgc gaa aac cct cat gaa cat gag gcc tta	1056
Lys Ala Leu Lys Lys Asn Cys Glu Asn Pro His Glu His Glu Ala Leu	
340 345 350	
gaa aat cta tgt aag gaa aat aaa cca agt agt gat gga acg aaa aaa	1104
Glu Asn Leu Cys Lys Glu Asn Lys Pro Ser Ser Asp Gly Thr Lys Lys	
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tgt gat gaa cta gaa aaa gat gtt aac aaa act tgt aca agt ctt aca	1152
Cys Asp Glu Leu Glu Lys Asp Val Asn Lys Thr Cys Thr Ser Leu Thr	
370 375 380	
tca aca att ctt aaa aac cgt ctt tac att tca cct gat gga att gcg	1200
Ser Thr Ile Leu Lys Asn Arg Leu Tyr Ile Ser Pro Asp Gly Ile Ala	
385 390 395 400	
gaa tgg gga aaa tta ccg aca ttt ctt agt gat gaa gat tgt gca aaa	1248



Glu	Trp	Gly	Lys	Leu	Pro	Thr	Phe	Leu	Ser	Asp	Glu	Asp	Cys	Ala	Lys	
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Leu	Glu	Ser	Tyr	Cys	Phe	Tyr	Tyr	Lys	Glu	Thr	Cys	Pro	Asp	Val	Lys	
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gaa	gct	tgt	atg	aat	gtg	agg	gca	gcg	tgt	tac	aag	aga	ggg	ctt	gat	1344
Glu	Ala	Cys	Met	Asn	Val	Arg	Ala	Ala	Cys	Tyr	Lys	Arg	Gly	Leu	Asp	
			435				440					445				
gca	cgg	gca	aac	agt	gtg	ttg	caa	aaa	aat	atg	cgt	ggg	tta	tta	cgt	1392
Ala	Arg	Ala	Asn	Ser	Val	Leu	Gln	Lys	Asn	Met	Arg	Gly	Leu	Leu	Arg	
			450			455					460					
ggt	tca	aat	caa	agt	tgg	ctt	aag	gag	ttt	caa	caa	aga	tta	gta	aaa	1440
Gly	Ser	Asn	Gln	Ser	Trp	Leu	Lys	Glu	Phe	Gln	Gln	Arg	Leu	Val	Lys	
465					470					475					480	
gta	tgt	aag	gag	cta	aaa	gaa	aat	aaa	gga	agt	ttc	cca	aac	gat	gaa	1488
Val	Cys	Lys	Glu	Leu	Lys	Glu	Asn	Lys	Gly	Ser	Phe	Pro	Asn	Asp	Glu	
				485					490					495		
ata	ttt	gtt	ctg	tgt	gta	cag	cca	gca	aaa	gct	gca	cga	tta	ctt	aca	1536
Ile	Phe	Val	Leu	Cys	Val	Gln	Pro	Ala	Lys	Ala	Ala	Arg	Leu	Leu	Thr	
			500					505					510			
cac	gat	cat	caa	atg	agg	gtt	acc	ttt	tta	cga	caa	caa	ttg	gat	caa	1584
His	Asp	His	Gln	Met	Arg	Val	Thr	Phe	Leu	Arg	Gln	Gln	Leu	Asp	Gln	
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aag	aga	gat	ttt	ccg	aca	gat	aaa	gac	tgc	aag	gaa	cta	ggg	aaa	aaa	1632
Lys	Arg	Asp	Phe	Pro	Thr	Asp	Lys	Asp	Cys	Lys	Glu	Leu	Gly	Lys	Lys	
			530			535					540					
tgc	caa	gat	tta	gga	aag	gat	tca	aaa	gaa	att	aca	tgg	cca	tgt	cat	1680
Cys	Gln	Asp	Leu	Gly	Lys	Asp	Ser	Lys	Glu	Ile	Thr	Trp	Pro	Cys	His	
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Thr	Leu	Glu	Gln	Gln	Cys	Asn	Arg	Leu	Gly	Thr	Thr	Glu	Ile	Leu	Lys	
				565					570					575		
cag	gtt	tta	ttg	gat	gaa	cac	aaa	gat	act	ttg	aaa	gac	caa	gaa	agt	1776
Gln	Val	Leu	Leu	Asp	Glu	His	Lys	Asp	Thr	Leu	Lys	Asp	Gln	Glu	Ser	
			580				585						590			
tgt	gta	aaa	tac	cta	aaa	gaa	aag	tgt	aat	aaa	tgg	tct	aga	aga	gga	1824
Cys	Val	Lys	Tyr	Leu	Lys	Glu	Lys	Cys	Asn	Lys	Trp	Ser	Arg	Arg	Gly	
			595				600					605				
gat	gac	cgt	ttc	tct	ttt	gta	tgt	gtt	ttc	caa	aac	gct	acg	tgt	gag	1872
Asp	Asp	Arg	Phe	Ser	Phe	Val	Cys	Val	Phe	Gln	Asn	Ala	Thr	Cys	Glu	
			610			615						620				
ctg	atg	gta	aaa	gac	gtg	aaa	gac	agg	tgt	gaa	gta	ttc	aaa	aaa	aat	1920
Leu	Met	Val	Lys	Asp	Val	Lys	Asp	Arg	Cys	Glu	Val	Phe	Lys	Lys	Asn	
625					630					635					640	
ata	aaa	gct	tca	tat	att	att	gaa	ttt	ctt	gaa	aat	aat	aca	aat	aaa	1968
Ile	Lys	Ala	Ser	Tyr	Ile	Ile	Glu	Phe	Leu	Glu	Asn	Asn	Thr	Asn	Lys	



645										650										655										
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Ile	Thr	Thr	Leu	Glu	Arg	Asn	Cys	Pro	Ser	Trp	His	Thr	Tyr	Cys	Asn															
			660					665					670																	
aga	ttt	tca	cct	aat	tgt	cca	ggc	ctt	acg	aaa	gag	aat	agt	tgt	aca		2064													
Arg	Phe	Ser	Pro	Asn	Cys	Pro	Gly	Leu	Thr	Lys	Glu	Asn	Ser	Cys	Thr															
			675				680					685																		
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Lys	Ile	Lys	Lys	His	Cys	Glu	Pro	Phe	Tyr	Lys	Arg	Lys	Ala	Leu	Glu															
			690			695					700																			
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Asp	Ala	Leu	Lys	Val	Glu	Leu	Gln	Gly	Lys	Leu	Thr	Asp	Lys	Ser	Lys															
					710					715					720															
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Cys	Glu	Pro	Ala	Leu	Asn	Arg	Tyr	Cys	Thr	Val	Ala	Gly	Asn	Val	Asn															
				725					730					735																
aat	gcg	tca	atc	agt	ggc	tta	tgc	aaa	gct	aac	acc	aag	gat	aac	tct		2256													
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			740					745					750																	
gga	aag	agt	gat	gag	gat	gct	aga	aag	gaa	ctc	tgt	gag	aaa	tca	gtg		2304													
Gly	Lys	Ser	Asp	Glu	Asp	Ala	Arg	Lys	Glu	Leu	Cys	Glu	Lys	Ser	Val															
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aaa	gaa	gtg	gaa	gaa	cag	tgc	aaa	gca	tta	cca	aca	gaa	tta	gga	caa		2352													
Lys	Glu	Val	Glu	Glu	Gln	Cys	Lys	Ala	Leu	Pro	Thr	Glu	Leu	Gly	Gln															
			770			775					780																			
ccg	gca	gct	gat	cta	aaa	aaa	gat	tat	aag	aca	tat	gag	gaa	ctt	aag		2400													
Pro	Ala	Ala	Asp	Leu	Lys	Lys	Asp	Tyr	Lys	Thr	Tyr	Glu	Glu	Leu	Lys															
					790					795					800															
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Lys	Arg	Ala	Glu	Glu	Ala	Met	Asn	Lys	Ser	Ser	Leu	Val	Leu	Ser	Leu															
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att	aag	aaa	aac	gaa	agt	aat	gta	tca	aaa	agt	aat	agc	aaa	aac	aag		2496													
Ile	Lys	Lys	Asn	Glu	Ser	Asn	Val	Ser	Lys	Ser	Asn	Ser	Lys	Asn	Lys															
			820					825					830																	
gat	aag	aat	gcc	gtt	tca	aac	gga	ctt	caa	gat	acc	aca	aaa	cat	gtg		2544													
Asp	Lys	Asn	Ala	Val	Ser	Asn	Gly	Leu	Gln	Asp	Thr	Thr	Lys	His	Val															
			835				840					845																		
aaa	ata	cta	cgg	aga	gga	gtt	aag	gat	gta	tcc	gta	aca	gaa	tta	gaa		2592													
Lys	Ile	Leu	Arg	Arg	Gly	Val	Lys	Asp	Val	Ser	Val	Thr	Glu	Leu	Glu															
			850			855					860																			
gct	aaa	gca	ttt	gat	ttg	gca	gca	gaa	gta	ttt	gga	aga	tat	gta	gat		2640													
Ala	Lys	Ala	Phe	Asp	Leu	Ala	Ala	Glu	Val	Phe	Gly	Arg	Tyr	Val	Asp															
					870				875					880																
ttg	aag	gaa	aga	tgt	aat	aaa	ttg	gaa	tca	gat	tgc	aga	att	aag	gag		2688													
Leu	Lys	Glu	Arg	Cys	Asn	Lys	Leu	Glu	Ser	Asp	Cys	Arg	Ile	Lys	Glu															
				885				890						895																



gat tgc aaa gac tta gaa gaa gta tgc aaa aag att aat aag gct tgt 2736  
Asp Cys Lys Asp Leu Glu Glu Val Cys Lys Lys Ile Asn Lys Ala Cys  
900 905 910

cgc aat ctg aag cct ctg gag gtg aag ccg cac gaa aca gtg aca gaa 2784  
Arg Asn Leu Lys Pro Leu Glu Val Lys Pro His Glu Thr Val Thr Glu  
915 920 925

ggt aca acg aca act aca aca aca aca aca acc gtt gcc gat ccg aag 2832  
Gly Thr Thr Thr Thr Thr Thr Thr Thr Thr Thr Val Ala Asp Pro Lys  
930 935 940

gca acg gaa tgc aaa tcc tta cag aca aca gac aca tgg gtt aca cag 2880  
Ala Thr Glu Cys Lys Ser Leu Gln Thr Thr Asp Thr Trp Val Thr Gln  
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aca tcg aca cac aca agc acg tct act atc aca tct acc atc aca tca 2928  
Thr Ser Thr His Thr Ser Thr Ser Thr Ile Thr Ser Thr Ile Thr Ser  
965 970 975

aaa ata aca ttg aca tca acg agg cga tgc aaa cca acc aag tgt acg 2976  
Lys Ile Thr Leu Thr Ser Thr Arg Arg Cys Lys Pro Thr Lys Cys Thr  
980 985 990

aca ggg gat gat gca gaa gac gtg aag cca agt gaa ggc ttg agg gtg 3024  
Thr Gly Asp Asp Ala Glu Asp Val Lys Pro Ser Glu Gly Leu Arg Val  
995 1000 1005

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Asp Thr Lys Cys Lys Thr Lys Leu Glu Glu Tyr Cys Lys Thr Leu Thr  
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Asn Ala Gly Leu Asn Pro Glu Lys Val His Glu Lys Leu Lys Asp Phe  
50 55 60

Cys Asp Asn Gly Lys Arg Asn Glu Lys Cys Gln Asp Leu Lys Asn Lys  
65 70 75 80

Val Asn Gln Lys Cys Ile Lys Phe Gln Gly Lys Leu Gln Thr Ala Ala  
85 90 95

28



Arg Lys Lys Ile Ser Glu Leu Thr Asp Glu Asp Cys Lys Lys Asn Glu  
 100 105 110  
 Gln Gln Cys Leu Phe Leu Glu Gly Ala Cys Pro Thr Glu Leu Lys Asp  
 115 120 125  
 Asp Cys Asn Lys Leu Arg Asn Asn Cys Tyr Gln Lys Glu Arg Asn Asn  
 130 135 140  
 Val Ala Glu Glu Val Leu Leu Arg Ala Leu Arg Gly Asp Leu Asn Glu  
 145 150 155 160  
 Thr Lys Thr Cys Glu Lys Lys Leu Lys Glu Val Cys Pro Lys Leu Glu  
 165 170 175  
 Arg Glu Ser Asp Glu Leu Thr Glu Leu Cys Leu Tyr Gln Lys Thr Thr  
 180 185 190  
 Cys Val Ser Leu Val Thr Lys Gly Lys Ser Lys Cys Asp Thr Leu Glu  
 195 200 205  
 Lys Glu Val Glu Glu Ala Leu Lys Lys Asn Glu Leu Arg Glu Lys Cys  
 210 215 220  
 Leu Leu Leu Leu Glu Gln Cys Tyr Phe His Arg Gly Asn Cys Glu Gly  
 225 230 235 240  
 Asp Lys Ser Lys Cys Asn Lys Pro Asn Asn Lys Asp Cys Lys Glu Tyr  
 245 250 255  
 Val Pro Glu Cys Asp Glu Leu Ala Glu Lys Cys Gly Lys Glu Asn Ile  
 260 265 270  
 Val Tyr Met His Pro Gly Ser Asp Phe Asp Pro Thr Lys Pro Glu Pro  
 275 280 285  
 Thr Leu Ala Glu Asp Ile Gly Leu Glu Glu Leu Tyr Lys Arg Ala Glu  
 290 295 300  
 Glu Asp Gly Ile Phe Val Gly Arg Gln His Val Arg Asp Ala Thr Ala  
 305 310 315 320  
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 Lys Ala Leu Lys Lys Asn Cys Glu Asn Pro His Glu His Glu Ala Leu  
 340 345 350  
 Glu Asn Leu Cys Lys Glu Asn Lys Pro Ser Ser Asp Gly Thr Lys Lys  
 355 360 365  
 Cys Asp Glu Leu Glu Lys Asp Val Asn Lys Thr Cys Thr Ser Leu Thr  
 370 375 380  
 Ser Thr Ile Leu Lys Asn Arg Leu Tyr Ile Ser Pro Asp Gly Ile Ala  
 385 390 395 400  
 Glu Trp Gly Lys Leu Pro Thr Phe Leu Ser Asp Glu Asp Cys Ala Lys  
 405 410 415



Leu Glu Ser Tyr Cys Phe Tyr Tyr Lys Glu Thr Cys Pro Asp Val Lys  
 420 425 430  
 Glu Ala Cys Met Asn Val Arg Ala Ala Cys Tyr Lys Arg Gly Leu Asp  
 435 440 445  
 Ala Arg Ala Asn Ser Val Leu Gln Lys Asn Met Arg Gly Leu Leu Arg  
 450 455 460  
 Gly Ser Asn Gln Ser Trp Leu Lys Glu Phe Gln Gln Arg Leu Val Lys  
 465 470 475 480  
 Val Cys Lys Glu Leu Lys Glu Asn Lys Gly Ser Phe Pro Asn Asp Glu  
 485 490 495  
 Ile Phe Val Leu Cys Val Gln Pro Ala Lys Ala Ala Arg Leu Leu Thr  
 500 505 510  
 His Asp His Gln Met Arg Val Thr Phe Leu Arg Gln Gln Leu Asp Gln  
 515 520 525  
 Lys Arg Asp Phe Pro Thr Asp Lys Asp Cys Lys Glu Leu Gly Lys Lys  
 530 535 540  
 Cys Gln Asp Leu Gly Lys Asp Ser Lys Glu Ile Thr Trp Pro Cys His  
 545 550 555 560  
 Thr Leu Glu Gln Gln Cys Asn Arg Leu Gly Thr Thr Glu Ile Leu Lys  
 565 570 575  
 Gln Val Leu Leu Asp Glu His Lys Asp Thr Leu Lys Asp Gln Glu Ser  
 580 585 590  
 Cys Val Lys Tyr Leu Lys Glu Lys Cys Asn Lys Trp Ser Arg Arg Gly  
 595 600 605  
 Asp Asp Arg Phe Ser Phe Val Cys Val Phe Gln Asn Ala Thr Cys Glu  
 610 615 620  
 Leu Met Val Lys Asp Val Lys Asp Arg Cys Glu Val Phe Lys Lys Asn  
 625 630 635 640  
 Ile Lys Ala Ser Tyr Ile Ile Glu Phe Leu Glu Asn Asn Thr Asn Lys  
 645 650 655  
 Ile Thr Thr Leu Glu Arg Asn Cys Pro Ser Trp His Thr Tyr Cys Asn  
 660 665 670  
 Arg Phe Ser Pro Asn Cys Pro Gly Leu Thr Lys Glu Asn Ser Cys Thr  
 675 680 685  
 Lys Ile Lys Lys His Cys Glu Pro Phe Tyr Lys Arg Lys Ala Leu Glu  
 690 695 700  
 Asp Ala Leu Lys Val Glu Leu Gln Gly Lys Leu Thr Asp Lys Ser Lys  
 705 710 715 720  
 Cys Glu Pro Ala Leu Asn Arg Tyr Cys Thr Val Ala Gly Asn Val Asn  
 725 730 735  
 Asn Ala Ser Ile Ser Gly Leu Cys Lys Ala Asn Thr Lys Asp Asn Ser  
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740	745	750
Gly Lys Ser Asp Glu Asp Ala Arg Lys Glu Leu Cys Glu Lys Ser Val 755	760	765
Lys Glu Val Glu Glu Gln Cys Lys Ala Leu Pro Thr Glu Leu Gly Gln 770	775	780
Pro Ala Ala Asp Leu Lys Lys Asp Tyr Lys Thr Tyr Glu Glu Leu Lys 785	790	795
Lys Arg Ala Glu Glu Ala Met Asn Lys Ser Ser Leu Val Leu Ser Leu 805	810	815
Ile Lys Lys Asn Glu Ser Asn Val Ser Lys Ser Asn Ser Lys Asn Lys 820	825	830
Asp Lys Asn Ala Val Ser Asn Gly Leu Gln Asp Thr Thr Lys His Val 835	840	845
Lys Ile Leu Arg Arg Gly Val Lys Asp Val Ser Val Thr Glu Leu Glu 850	855	860
Ala Lys Ala Phe Asp Leu Ala Ala Glu Val Phe Gly Arg Tyr Val Asp 865	870	875
Leu Lys Glu Arg Cys Asn Lys Leu Glu Ser Asp Cys Arg Ile Lys Glu 885	890	895
Asp Cys Lys Asp Leu Glu Glu Val Cys Lys Lys Ile Asn Lys Ala Cys 900	905	910
Arg Asn Leu Lys Pro Leu Glu Val Lys Pro His Glu Thr Val Thr Glu 915	920	925
Gly Thr Thr Thr Thr Thr Thr Thr Thr Thr Thr Thr Val Ala Asp Pro Lys 930	935	940
Ala Thr Glu Cys Lys Ser Leu Gln Thr Thr Asp Thr Trp Val Thr Gln 945	950	955
Thr Ser Thr His Thr Ser Thr Ser Thr Ile Thr Ser Thr Ile Thr Ser 965	970	975
Lys Ile Thr Leu Thr Ser Thr Arg Arg Cys Lys Pro Thr Lys Cys Thr 980	985	990
Thr Gly Asp Asp Ala Glu Asp Val Lys Pro Ser Glu Gly Leu Arg Val 995	1000	1005
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Val Tyr Asp Gly Glu Glu Ile Leu Leu Ala Leu Ile Ala Gly Lys Lys	
20 25 30	
tat aat gat aat gaa tgc aaa aaa gaa tta gaa aaa tat tgt aag aca	144
Tyr Asn Asp Asn Glu Cys Lys Lys Glu Leu Glu Lys Tyr Cys Lys Thr	
35 40 45	
tta acg gat gca gaa tta aaa cca gaa aaa gtt cac aaa aaa ctt aag	192
Leu Thr Asp Ala Glu Leu Lys Pro Glu Lys Val His Lys Lys Leu Lys	
50 55 60	
gag ttt tgt gaa aat aaa aaa gca gat tca aaa tgc aaa gaa ctg aaa	240
Glu Phe Cys Glu Asn Lys Lys Ala Asp Ser Lys Cys Lys Glu Leu Lys	
65 70 75 80	
gaa aaa ctc act caa aaa tgt act gca atc aaa gga aaa ctt aca gaa	288
Glu Lys Leu Thr Gln Lys Cys Thr Ala Ile Lys Gly Lys Leu Thr Glu	
85 90 95	
gca atc aaa aaa aaa aat tca gat tta acg gat gaa gat tgc aaa gag	336
Ala Ile Lys Lys Lys Asn Ser Asp Leu Thr Asp Glu Asp Cys Lys Glu	
100 105 110	
aat gaa caa caa tgc cta ttt ttg gag gga gca tgt cca gcg gaa ctt	384
Asn Glu Gln Gln Cys Leu Phe Leu Glu Gly Ala Cys Pro Ala Glu Leu	
115 120 125	
aaa gat gat tgc aat act ttg aga aat aag tgc tat caa aaq aag cgt	432
Lys Asp Asp Cys Asn Thr Leu Arg Asn Lys Cys Tyr Gln Lys Lys Arg	
130 135 140	
gat aaa gtg gcg gaa gaa gct ctt tta aga gca gtt cgt gga ggt cta	480
Asp Lys Val Ala Glu Glu Ala Leu Leu Arg Ala Val Arg Gly Gly Leu	
145 150 155 160	
atc aat gaa act aca tgt gaa gga aag ctc aaa gag gtt tgc ata gag	528
Ile Asn Glu Thr Thr Cys Glu Gly Lys Leu Lys Glu Val Cys Ile Glu	
165 170 175	
ttg agt caa gaa agt gat gag tta acg aag ctt tgt ctt tat caa aaa	576
Leu Ser Gln Glu Ser Asp Glu Leu Thr Lys Leu Cys Leu Tyr Gln Lys	
180 185 190	
atg acg tgc aaa aca ttt gta tta gaa aaa caa aaa aaa tgt aat gct	624
Met Thr Cys Lys Thr Phe Val Leu Glu Lys Gln Lys Lys Cys Asn Ala	
195 200 205	
ctt aaa cag gat gtt aac gca gca ctt gag aag aaa gat gag tta cga	672
Leu Lys Gln Asp Val Asn Ala Ala Leu Glu Lys Lys Asp Glu Leu Arg	
210 215 220	



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Gly Lys Cys Leu Pro Leu Leu Glu Arg Cys Tyr Phe Tyr Arg Gly Asn	
225 230 235 240	
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Cys Glu Asp Ile Ser Lys Cys Asn Lys Ser Ser Glu Asp Cys Tyr Glu	
245 250 255	
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Tyr Leu Pro Val Cys Asp Thr Leu Ala Val Lys Cys Glu Glu Asn Lys	
260 265 270	
att att tat aca cat ccg gga tcc gat ttc aat cca act aag tca aag	864
Ile Ile Tyr Thr His Pro Gly Ser Asp Phe Asn Pro Thr Lys Ser Lys	
275 280 285	
cct act gta gca gaa gac ata gga ctg gaa gag ctt tat aaa aag gcc	912
Pro Thr Val Ala Glu Asp Ile Gly Leu Glu Glu Leu Tyr Lys Lys Ala	
290 295 300	
gca gaa gaa ggt gtt cat att gga aag cct cct gta aga gat gca act	960
Ala Glu Glu Gly Val His Ile Gly Lys Pro Pro Val Arg Asp Ala Thr	
305 310 315 320	
gct cta ctg gcg ctt ttg att caa aat cta gat cct aag agt caa gtg	1008
Ala Leu Leu Ala Leu Leu Ile Gln Asn Leu Asp Pro Lys Ser Gln Val	
325 330 335	
ggt aaa gaa tgc gaa aaa gtt ctt aaa gat aac tgt aaa gag tta aaa	1056
Gly Lys Glu Cys Glu Lys Val Leu Lys Asp Asn Cys Lys Glu Leu Lys	
340 345 350	
agt cat gaa att ttg gga gat ttt tgt aat caa aat gta gct ggt caa	1104
Ser His Glu Ile Leu Gly Asp Phe Cys Asn Gln Asn Val Ala Gly Gln	
355 360 365	
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Asn Glu Ile Glu Lys Cys Lys Glu Leu Glu Lys Glu Leu Ala Asn Ser	
370 375 380	
act aaa att ctt ttt gaa aaa ata aag aat aaa cac ctc tct gga tcc	1200
Thr Lys Ile Leu Phe Glu Lys Ile Lys Asn Lys His Leu Ser Gly Ser	
385 390 395 400	
gga gaa gtc att cca tgg tat aag ttg acg aca ttt ctt agt gac aat	1248
Gly Glu Val Ile Pro Trp Tyr Lys Leu Thr Thr Phe Leu Ser Asp Asn	
405 410 415	
gac tgc aca agg tta gag tca gac tgt ttt tat tta aaa agt caa gca	1296
Asp Cys Thr Arg Leu Glu Ser Asp Cys Phe Tyr Leu Lys Ser Gln Ala	
420 425 430	
cct ctt gac aaa gaa tgt aat aat ctg aag gca gca tgt tat aag aga	1344
Pro Leu Asp Lys Glu Cys Asn Asn Leu Lys Ala Ala Cys Tyr Lys Arg	
435 440 445	
ggg ctt gaa gca caa gct aat gaa gca ttg cag aaa aag atg tac gga	1392
Gly Leu Glu Ala Gln Ala Asn Glu Ala Leu Gln Lys Lys Met Tyr Gly	
450 455 460	



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Leu Phe Tyr Gly Ser Gly Lys Glu Trp Phe Lys Lys Leu Leu Glu Lys	
465 470 475 480	
ata atg gaa gaa tgt tcg gaa ctt aaa aca aca agc gat gag ttg ttt	1488
Ile Met Glu Glu Cys Ser Glu Leu Lys Thr Thr Ser Asp Glu Leu Phe	
485 490 495	
ttg cta tgt att gat cca ctt aaa gca gtc aga ata ctt gca gct gat	1536
Leu Leu Cys Ile Asp Pro Leu Lys Ala Val Arg Ile Leu Ala Ala Asp	
500 505 510	
atc caa gca aga gca gtc ttt ttg cgg aaa caa ttg gat caa aag cga	1584
Ile Gln Ala Arg Ala Val Phe Leu Arg Lys Gln Leu Asp Gln Lys Arg	
515 520 525	
gac ttt cca aca gac aaa gat tgc aag gaa tta gga aga aag tgt gaa	1632
Asp Phe Pro Thr Asp Lys Asp Cys Lys Glu Leu Gly Arg Lys Cys Glu	
530 535 540	
gct tta ggg aag gat tca aat cag att aag tgg cca tgt cat acg cta	1680
Ala Leu Gly Lys Asp Ser Asn Gln Ile Lys Trp Pro Cys His Thr Leu	
545 550 555 560	
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Lys Gln Gln Cys Asp Arg Leu Gly Thr Thr Glu Ile Leu Lys Gln Val	
565 570 575	
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Leu Leu Asp Glu His Lys Asp Thr Leu Arg Thr His Glu Asn Cys Thr	
580 585 590	
aaa tat tta aag aga aaa tgt cat aaa tgg tct aga agg ggt gat gat	1824
Lys Tyr Leu Lys Arg Lys Cys His Lys Trp Ser Arg Arg Gly Asp Asp	
595 600 605	
cgt ttc tct ttt gta tgt gtt tac caa aac gct acg tgt aag ctg ata	1872
Arg Phe Ser Phe Val Cys Val Tyr Gln Asn Ala Thr Cys Lys Leu Ile	
610 615 620	
gta gat gat gtg aaa gac agg tgt gaa gta ttt gaa aaa aat atg caa	1920
Val Asp Asp Val Lys Asp Arg Cys Glu Val Phe Glu Lys Asn Met Gln	
625 630 635 640	
gcg tca gat att aat aat tct ctt aaa aat aaa caa ata aaa aca gaa	1968
Ala Ser Asp Ile Asn Asn Ser Leu Lys Asn Lys Gln Ile Lys Thr Glu	
645 650 655	
tca gca gca aat att tgt ccc tca tgg cac cca tac tgc gat aga ttt	2016
Ser Ala Ala Asn Ile Cys Pro Ser Trp His Pro Tyr Cys Asp Arg Phe	
660 665 670	
tta ccc aat tgt cct gat ctt aag aaa gga aaa act ttc tgt caa aat	2064
Leu Pro Asn Cys Pro Asp Leu Lys Lys Gly Lys Thr Phe Cys Gln Asn	
675 680 685	
ctt aaa aaa tat tgc gaa cca ttc tac aaa agg aag gtt tta gaa gat	2112
Leu Lys Lys Tyr Cys Glu Pro Phe Tyr Lys Arg Lys Val Leu Glu Asp	
690 695 700	
gct ctt aaa gta gag ctt caa ggg aat tta agt aat aga aat aaa tgt	2160



Ala Leu Lys Val Glu Leu Gln Gly Asn Leu Ser Asn Arg Asn Lys Cys	
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Glu Ser Ala Leu Glu Arg Tyr Cys Thr Ile Leu Lys Asn Val Ser Asp	
725 730 735	
tca tca atc aac agt tta tgt aaa gat aat acc gaa agt aaa act aaa	2256
Ser Ser Ile Asn Ser Leu Cys Lys Asp Asn Thr Glu Ser Lys Thr Lys	
740 745 750	
aag acc gat aat gaa gtt aga aag aag ctt tgt cta aaa tta gtg gaa	2304
Lys Thr Asp Asn Glu Val Arg Lys Lys Leu Cys Leu Lys Leu Val Glu	
755 760 765	
gag gtg gaa cag caa tgt aaa atg tta cca gca gaa ttg gag cat gag	2352
Glu Val Glu Gln Gln Cys Lys Met Leu Pro Ala Glu Leu Glu His Glu	
770 775 780	
gaa aaa gac cta aaa gat gat ttt gaa aca ttt gaa aaa ctt aaa aaa	2400
Glu Lys Asp Leu Lys Asp Asp Phe Glu Thr Phe Glu Lys Leu Lys Lys	
785 790 795 800	
cag gca gag aaa aca atg aat aaa tcc aat ctt gtt tta tca ttc gtt	2448
Gln Ala Glu Lys Thr Met Asn Lys Ser Asn Leu Val Leu Ser Phe Val	
805 810 815	
aag aaa gat gaa aat aat aca tcg aaa aat agt agc aaa gac aag gat	2496
Lys Lys Asp Glu Asn Asn Thr Ser Lys Asn Ser Ser Lys Asp Lys Asp	
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Lys Asn Thr Val Ser Asn Gly Leu Gln Asp Thr Thr Glu His Met Lys	
835 840 845	
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Ile Leu Arg Arg Gly Val Lys Asp Val Ser Val Thr Glu Ser Glu Ala	
850 855 860	
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Lys Ala Phe Asp Leu Val Ala Glu Val Phe Gly Arg Tyr Leu Asp Leu	
865 870 875 880	
aaa gaa aga tgt aat aaa ttg gaa tca gat tgc aga gtt aag gag gat	2688
Lys Glu Arg Cys Asn Lys Leu Glu Ser Asp Cys Arg Val Lys Glu Asp	
885 890 895	
tgc aag gat tta gaa gga gta tgt gga aag ata caa gga gta tgt tcg	2736
Cys Lys Asp Leu Glu Gly Val Cys Gly Lys Ile Gln Gly Val Cys Ser	
900 905 910	
aaa tta aaa cca ctg aaa gtg aag ccg cac gaa aca gtg aca gaa agc	2784
Lys Leu Lys Pro Leu Lys Val Lys Pro His Glu Thr Val Thr Glu Ser	
915 920 925	
aca acg acg acc acg acg aca aca acg acc gtt act gat ccg aag gca	2832
Thr Thr Thr Thr Thr Thr Thr Thr Thr Thr Val Thr Asp Pro Lys Ala	
930 935 940	
aca gaa tgc aaa tct tta cag aca aca gat aca tgg att aca cag act	2880
Thr Glu Cys Lys Ser Leu Gln Thr Thr Asp Thr Trp Ile Thr Gln Thr	



945                      950                      955                      960  
 tcg aca cat acc agc acg tct acc atc aca tct aca atc aca tca aaa 2928  
 Ser Thr His Thr Ser Thr Ser Thr Ile Thr Ser Thr Ile Thr Ser Lys  
                                  965                                   970                                   975  
 ata aca ctc aca tca aca agg cgt tgc aaa cca acc aag tgt acg aca 2976  
 Ile Thr Leu Thr Ser Thr Arg Arg Cys Lys Pro Thr Lys Cys Thr Thr  
                                  980                                   985                                   990  
 ggg gat gat gca gag gac gtg aag ccg agt gag gga ttg aag atg agt 3024  
 Gly Asp Asp Ala Glu Asp Val Lys Pro Ser Glu Gly Leu Lys Met Ser  
                                  995                                   1000                                   1005  
 ggg tga aacgtgatga ggggggtgat agtagcaatg gttatttcgt tcatgattta g 3081  
 Gly  
     1010

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 <212> PRT  
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 Val Tyr Asp Gly Glu Glu Ile Leu Leu Ala Leu Ile Ala Gly Lys Lys  
                                  20                                   25                                   30  
 Tyr Asn Asp Asn Glu Cys Lys Lys Glu Leu Glu Lys Tyr Cys Lys Thr  
                                  35                                   40                                   45  
 Leu Thr Asp Ala Glu Leu Lys Pro Glu Lys Val His Lys Lys Leu Lys  
     50                                   55                                   60  
 Glu Phe Cys Glu Asn Lys Lys Ala Asp Ser Lys Cys Lys Glu Leu Lys  
     65                                   70                                   75                                   80  
 Glu Lys Leu Thr Gln Lys Cys Thr Ala Ile Lys Gly Lys Leu Thr Glu  
                                  85                                   90                                   95  
 Ala Ile Lys Lys Lys Asn Ser Asp Leu Thr Asp Glu Asp Cys Lys Glu  
                                  100                                   105                                   110  
 Asn Glu Gln Gln Cys Leu Phe Leu Glu Gly Ala Cys Pro Ala Glu Leu  
                                  115                                   120                                   125  
 Lys Asp Asp Cys Asn Thr Leu Arg Asn Lys Cys Tyr Gln Lys Lys Arg  
     130                                   135                                   140  
 Asp Lys Val Ala Glu Glu Ala Leu Leu Arg Ala Val Arg Gly Gly Leu  
     145                                   150                                   155                                   160  
 Ile Asn Glu Thr Thr Cys Glu Gly Lys Leu Lys Glu Val Cys Ile Glu  
                                  165                                   170                                   175  
 Leu Ser Gln Glu Ser Asp Glu Leu Thr Lys Leu Cys Leu Tyr Gln Lys  
                                  180                                   185                                   190



Met Thr Cys Lys Thr Phe Val Leu Glu Lys Gln Lys Lys Cys Asn Ala  
 195 200 205  
 Leu Lys Gln Asp Val Asn Ala Ala Leu Glu Lys Lys Asp Glu Leu Arg  
 210 215 220  
 Gly Lys Cys Leu Pro Leu Leu Glu Arg Cys Tyr Phe Tyr Arg Gly Asn  
 225 230 235 240  
 Cys Glu Asp Ile Ser Lys Cys Asn Lys Ser Ser Glu Asp Cys Tyr Glu  
 245 250 255  
 Tyr Leu Pro Val Cys Asp Thr Leu Ala Val Lys Cys Glu Glu Asn Lys  
 260 265 270  
 Ile Ile Tyr Thr His Pro Gly Ser Asp Phe Asn Pro Thr Lys Ser Lys  
 275 280 285  
 Pro Thr Val Ala Glu Asp Ile Gly Leu Glu Glu Leu Tyr Lys Lys Ala  
 290 295 300  
 Ala Glu Glu Gly Val His Ile Gly Lys Pro Pro Val Arg Asp Ala Thr  
 305 310 315 320  
 Ala Leu Leu Ala Leu Leu Ile Gln Asn Leu Asp Pro Lys Ser Gln Val  
 325 330 335  
 Gly Lys Glu Cys Glu Lys Val Leu Lys Asp Asn Cys Lys Glu Leu Lys  
 340 345 350  
 Ser His Glu Ile Leu Gly Asp Phe Cys Asn Gln Asn Val Ala Gly Gln  
 355 360 365  
 Asn Glu Ile Glu Lys Cys Lys Glu Leu Glu Lys Glu Leu Ala Asn Ser  
 370 375 380  
 Thr Lys Ile Leu Phe Glu Lys Ile Lys Asn Lys His Leu Ser Gly Ser  
 385 390 395 400  
 Gly Glu Val Ile Pro Trp Tyr Lys Leu Thr Thr Phe Leu Ser Asp Asn  
 405 410 415  
 Asp Cys Thr Arg Leu Glu Ser Asp Cys Phe Tyr Leu Lys Ser Gln Ala  
 420 425 430  
 Pro Leu Asp Lys Glu Cys Asn Asn Leu Lys Ala Ala Cys Tyr Lys Arg  
 435 440 445  
 Gly Leu Glu Ala Gln Ala Asn Glu Ala Leu Gln Lys Lys Met Tyr Gly  
 450 455 460  
 Leu Phe Tyr Gly Ser Gly Lys Glu Trp Phe Lys Lys Leu Leu Glu Lys  
 465 470 475 480  
 Ile Met Glu Glu Cys Ser Glu Leu Lys Thr Thr Ser Asp Glu Leu Phe  
 485 490 495  
 Leu Leu Cys Ile Asp Pro Leu Lys Ala Val Arg Ile Leu Ala Ala Asp  
 500 505 510  
 Ile Gln Ala Arg Ala Val Phe Leu Arg Lys Gln Leu Asp Gln Lys Arg



515	520	525
Asp Phe Pro Thr Asp Lys 530	Asp Cys Lys Glu Leu 535	Gly Arg Lys Cys Glu 540
Ala Leu Gly Lys Asp Ser 545	Asn Gln Ile Lys Trp 550	Pro Cys His Thr Leu 555
Lys Gln Gln Cys Asp Arg 565	Leu Gly Thr Thr Glu 570	Ile Leu Lys Gln Val 575
Leu Leu Asp Glu His Lys 580	Asp Thr Leu Arg Thr 585	His Glu Asn Cys Thr 590
Lys Tyr Leu Lys Arg Lys 595	Cys His Lys Trp Ser Arg 600	Arg Gly Asp Asp 605
Arg Phe Ser Phe Val Cys 610	Val Tyr Gln Asn Ala Thr 615	Cys Lys Leu Ile 620
Val Asp Asp Val Lys Asp 625	Arg Cys Glu Val Phe 630	Glu Lys Asn Met Gln 635
Ala Ser Asp Ile Asn Asn 645	Ser Leu Lys Asn Lys 650	Gln Ile Lys Thr Glu 655
Ser Ala Ala Asn Ile Cys 660	Pro Ser Trp His Pro 665	Tyr Cys Asp Arg Phe 670
Leu Pro Asn Cys Pro Asp 675	Leu Lys Lys Gly Lys Thr 680	Phe Cys Gln Asn 685
Leu Lys Lys Tyr Cys Glu 690	Pro Phe Tyr Lys Arg 695	Lys Val Leu Glu Asp 700
Ala Leu Lys Val Glu Leu 705	Gln Gly Asn Leu Ser 710	Asn Arg Asn Lys Cys 715
Glu Ser Ala Leu Glu Arg 725	Tyr Cys Thr Ile Leu 730	Lys Asn Val Ser Asp 735
Ser Ser Ile Asn Ser Leu 740	Cys Lys Asp Asn Thr 745	Glu Ser Lys Thr Lys 750
Lys Thr Asp Asn Glu Val 755	Arg Lys Lys Leu Cys 760	Leu Lys Leu Val Glu 765
Glu Val Glu Gln Gln Cys 770	Lys Met Leu Pro Ala 775	Glu Leu Glu His Glu 780
Glu Lys Asp Leu Lys Asp 785	Asp Phe Glu Thr Phe 790	Glu Lys Leu Lys Lys 795
Gln Ala Glu Lys Thr Met 805	Asn Lys Ser Asn Leu 810	Val Leu Ser Phe Val 815
Lys Lys Asp Glu Asn Asn 820	Thr Ser Lys Asn Ser 825	Ser Lys Asp Lys Asp 830
Lys Asn Thr Val Ser Asn 835	Gly Leu Gln Asp Thr 840	Thr Thr Glu His Met Lys 845



Ile Leu Arg Arg Gly Val Lys Asp Val Ser Val Thr Glu Ser Glu Ala  
 850 855 860

Lys Ala Phe Asp Leu Val Ala Glu Val Phe Gly Arg Tyr Leu Asp Leu  
 865 870 875 880

Lys Glu Arg Cys Asn Lys Leu Glu Ser Asp Cys Arg Val Lys Glu Asp  
 885 890 895

Cys Lys Asp Leu Glu Gly Val Cys Gly Lys Ile Gln Gly Val Cys Ser  
 900 905 910

Lys Leu Lys Pro Leu Lys Val Lys Pro His Glu Thr Val Thr Glu Ser  
 915 920 925

Thr Thr Thr Thr Thr Thr Thr Thr Thr Thr Val Thr Asp Pro Lys Ala  
 930 935 940

Thr Glu Cys Lys Ser Leu Gln Thr Thr Asp Thr Trp Ile Thr Gln Thr  
 945 950 955 960

Ser Thr His Thr Ser Thr Ser Thr Ile Thr Ser Thr Ile Thr Ser Lys  
 965 970 975

Ile Thr Leu Thr Ser Thr Arg Arg Cys Lys Pro Thr Lys Cys Thr Thr  
 980 985 990

Gly Asp Asp Ala Glu Asp Val Lys Pro Ser Glu Gly Leu Lys Met Ser  
 995 1000 1005

Gly

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 <213> *Pneumocystis carinii* sp. f. *hominis*

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gat gaa gtg aat att ttg gcg ttg att cta caa gaa gat gca atg gaa 96  
 Asp Glu Val Asn Ile Leu Ala Leu Ile Leu Gln Glu Asp Ala Met Glu  
 20 25 30

gat aca aaa tgc aaa aaa agt tta gaa aaa tac tgc gaa gag ttg aaa 144  
 Asp Thr Lys Cys Lys Lys Ser Leu Glu Lys Tyr Cys Glu Glu Leu Lys  
 35 40 45

aaa gca tca cta gac atg gaa aaa gta cat aaa atg ctt aaa gat ttc 192  
 Lys Ala Ser Leu Asp Met Glu Lys Val His Lys Met Leu Lys Asp Phe  
 50 55 60

tgt gga aat ggg aaa gca agt aaa gca aat aca aaa tgt caa ggt cta 240  
 39



Cys Gly Asn Gly Lys Ala Ser Lys Ala Asn Thr Lys Cys Gln Gly Leu	
65 70 75 80	
caa gcc aaa gtt acg ggg aaa tgt aca aat ttt aaa aca caa aag cta	288
Gln Ala Lys Val Thr Gly Lys Cys Thr Asn Phe Lys Thr Gln Lys Leu	
85 90 95	
gga cca gcg tta aca aat cca tca gat gat aat tgc aaa gag agt gaa	336
Gly Pro Ala Leu Thr Asn Pro Ser Asp Asp Asn Cys Lys Glu Ser Glu	
100 105 110	
cga caa tgc cta ttt ttg gag gga gca tgc cat aat ctt gta gaa gat	384
Arg Gln Cys Leu Phe Leu Glu Gly Ala Cys His Asn Leu Val Glu Asp	
115 120 125	
tgt aac aaa cta agg aat cta tgt tac cag aaa aaa cgt gac gga gta	432
Cys Asn Lys Leu Arg Asn Leu Cys Tyr Gln Lys Lys Arg Asp Gly Val	
130 135 140	
gca gaa gaa gtc ctt ttg agg gca ctt cgt agt gat ctc aat aaa aca	480
Ala Glu Glu Val Leu Leu Arg Ala Leu Arg Ser Asp Leu Asn Lys Thr	
145 150 155 160	
gaa aca cat gaa aaa aaa ctg aaa gag att tgc cca gtc ttg cag agg	528
Glu Thr His Glu Lys Lys Leu Lys Glu Ile Cys Pro Val Leu Gln Arg	
165 170 175	
gaa agt aat gaa tta acg gac ttg tgt ttg aac cag aaa aag acg tgc	576
Glu Ser Asn Glu Leu Thr Asp Leu Cys Leu Asn Gln Lys Lys Thr Cys	
180 185 190	
gag aat att ata aaa gaa aaa gat aaa aaa tgc act act ctt aaa gca	624
Glu Asn Ile Ile Lys Glu Lys Asp Lys Lys Cys Thr Thr Leu Lys Ala	
195 200 205	
aat gtt gca aca gca ctt gga agt ttt aaa aaa gaa ata tgc ctt gaa	672
Asn Val Ala Thr Ala Leu Gly Ser Phe Lys Lys Glu Ile Cys Leu Glu	
210 215 220	
tta ctt gaa caa tgc tat ttt tac att gga aat tgc gga gac gac gat	720
Leu Leu Glu Gln Cys Tyr Phe Tyr Ile Gly Asn Cys Gly Asp Asp Asp	
225 230 235 240	
ata att aaa tgt att gaa ttg gga ggg aaa tgc caa gaa caa aac att	768
Ile Ile Lys Cys Ile Glu Leu Gly Gly Lys Cys Gln Glu Gln Asn Ile	
245 250 255	
gtt tat ata cca cca gga ccc gat ttt gat cca act aga cca gag gct	816
Val Tyr Ile Pro Pro Gly Pro Asp Phe Asp Pro Thr Arg Pro Glu Ala	
260 265 270	
aca cta gca gag gac ata gac ctg gat gag ctt tat aaa aag gca gaa	864
Thr Leu Ala Glu Asp Ile Asp Leu Asp Glu Leu Tyr Lys Lys Ala Glu	
275 280 285	
gag gat ggt gtt ttt att gga aaa cat cat tta aga gat gcg aca gct	912
Glu Asp Gly Val Phe Ile Gly Lys His His Leu Arg Asp Ala Thr Ala	
290 295 300	
tta ttg acg ttg ttg gtt aag aaa gat gat aca gga aaa aat aat aat	960
Leu Leu Thr Leu Leu Val Lys Lys Asp Asp Thr Gly Lys Asn Asn Asn	



305	310	315	320	
atc gga gaa aaa tgc aat aag att ctc gaa gat aaa tgc aaa aac tct				1008
Ile Gly Glu Lys Cys Asn Lys Ile Leu Glu Asp Lys Cys Lys Asn Ser	325	330	335	
caa cag cat gaa gct cta aaa aat tta tgt aat aat aat agt cct aat				1056
Gln Gln His Glu Ala Leu Lys Asn Leu Cys Asn Asn Asn Ser Pro Asn	340	345	350	
gca tat gga aaa gaa aaa tgc aaa gaa tta gaa gaa gat att aaa aaa				1104
Ala Tyr Gly Lys Glu Lys Cys Lys Glu Leu Glu Glu Asp Ile Lys Lys	355	360	365	
aca tgc aca aac ctc aaa cca acg att ctt aaa aac cat ctt tat gat				1152
Thr Cys Thr Asn Leu Lys Pro Thr Ile Leu Lys Asn His Leu Tyr Asp	370	375	380	
cca aat gat aaa att gtt gag tgg aga aaa ctg cca aca ttt ctt act				1200
Pro Asn Asp Lys Ile Val Glu Trp Arg Lys Leu Pro Thr Phe Leu Thr	385	390	395	400
aat gaa gac tgt gca aga ttg gaa tct tat tgt ttt tac tac gaa aaa				1248
Asn Glu Asp Cys Ala Arg Leu Glu Ser Tyr Cys Phe Tyr Tyr Glu Lys	405	410	415	
gct tgt cca aat gcc aaa gaa gag tgt atg aat ttg agg gca gcg tgt				1296
Ala Cys Pro Asn Ala Lys Glu Glu Cys Met Asn Leu Arg Ala Ala Cys	420	425	430	
tat aag aga ggg ctt gat gga cgg gca aat aaa gtg ctg caa gaa aat				1344
Tyr Lys Arg Gly Leu Asp Gly Arg Ala Asn Lys Val Leu Gln Glu Asn	435	440	445	
atg cgt ggg tta tta cgt ggt tca aat caa agt tgg ctt aag gag ttt				1392
Met Arg Gly Leu Leu Arg Gly Ser Asn Gln Ser Trp Leu Lys Glu Phe	450	455	460	
caa caa aga tta gta aaa gta tgt aag gag cta aaa gaa aat aaa gga				1440
Gln Gln Arg Leu Val Lys Val Cys Lys Glu Leu Lys Glu Asn Lys Gly	465	470	475	480
agt ttc cca aac gat gaa ata ttt gtt ctg tgt gta cag cca gca aaa				1488
Ser Phe Pro Asn Asp Glu Ile Phe Val Leu Cys Val Gln Pro Ala Lys	485	490	495	
gct gca cga tta ctt aca cac gat cat caa atg agg gtt atc ttt tta				1536
Ala Ala Arg Leu Leu Thr His Asp His Gln Met Arg Val Ile Phe Leu	500	505	510	
cga caa caa ttg gat caa aag aga gat ttt ccg aca gat aaa gac tgc				1584
Arg Gln Gln Leu Asp Gln Lys Arg Asp Phe Pro Thr Asp Lys Asp Cys	515	520	525	
aag gaa tta ggg aaa aaa tgc caa gat tta gga aag gat tca aaa gaa				1632
Lys Glu Leu Gly Lys Lys Cys Gln Asp Leu Gly Lys Asp Ser Lys Glu	530	535	540	
att aca tgg cca tgt cat acg ctg gag cag caa tgc aat cgc ttg ggg				1680
Ile Thr Trp Pro Cys His Thr Leu Glu Gln Gln Cys Asn Arg Leu Gly	545	550	555	560



act aca gaa att tta aag cag gtt tta ttg gat gaa cac aaa gat act	1728
Thr Thr Glu Ile Leu Lys Gln Val Leu Leu Asp Glu His Lys Asp Thr	
565 570 575	
ttg aaa gac caa gaa agt tgt gta aaa tac cta aaa gaa aag tgt aat	1776
Leu Lys Asp Gln Glu Ser Cys Val Lys Tyr Leu Lys Glu Lys Cys Asn	
580 585 590	
aaa tgg tct aga aga gga gat gac cgt ttc tct ttt gta tgt gtc ttc	1824
Lys Trp Ser Arg Arg Gly Asp Asp Arg Phe Ser Phe Val Cys Val Phe	
595 600 605	
caa aac gct acg tgt gag ctg atg gta aaa gac gtg aaa gac agg tgt	1872
Gln Asn Ala Thr Cys Glu Leu Met Val Lys Asp Val Lys Asp Arg Cys	
610 615 620	
gaa gta ttc aaa aaa aat ata aaa gct tca tat att att gaa ttt ctt	1920
Glu Val Phe Lys Lys Asn Ile Lys Ala Ser Tyr Ile Ile Glu Phe Leu	
625 630 635 640	
gaa aat aat aca aat aaa ata aca aca ctg gaa aga aat tgt ccc tct	1968
Glu Asn Asn Thr Asn Lys Ile Thr Thr Leu Glu Arg Asn Cys Pro Ser	
645 650 655	
tgg cat acg tat tgc aat aga ttt tca cct aat tgt cca ggt ctt acg	2016
Trp His Thr Tyr Cys Asn Arg Phe Ser Pro Asn Cys Pro Gly Leu Thr	
660 665 670	
aaa gag aat agt tgt aca aaa atc aag aag cat tgt gag ccg ttc tat	2064
Lys Glu Asn Ser Cys Thr Lys Ile Lys Lys His Cys Glu Pro Phe Tyr	
675 680 685	
aaa aga aag gcc ttg gaa gat gct ctc aaa gta gag ctt caa gga aaa	2112
Lys Arg Lys Ala Leu Glu Asp Ala Leu Lys Val Glu Leu Gln Gly Lys	
690 695 700	
ttg act gat aaa tct aaa tgt gaa cct gca ttg aaa aga tat tgt aca	2160
Leu Thr Asp Lys Ser Lys Cys Glu Pro Ala Leu Lys Arg Tyr Cys Thr	
705 710 715 720	
gta gcg gga aac gta aat aat gcg tca atc agt ggc tta tgc aaa gct	2208
Val Ala Gly Asn Val Asn Asn Ala Ser Ile Ser Gly Leu Cys Lys Ala	
725 730 735	
aac acc aag gat aac tct gga aag agt gat gag gat gct aga aag gaa	2256
Asn Thr Lys Asp Asn Ser Gly Lys Ser Asp Glu Asp Ala Arg Lys Glu	
740 745 750	
ctc tgt gag aaa tta gtg aaa gaa gtg gaa gaa cag tgc aaa gca tta	2304
Leu Cys Glu Lys Leu Val Lys Glu Val Glu Glu Gln Cys Lys Ala Leu	
755 760 765	
cca aca gaa tta gga caa ccg gca gct gat tta aaa aaa gat tat aag	2352
Pro Thr Glu Leu Gly Gln Pro Ala Ala Asp Leu Lys Lys Asp Tyr Lys	
770 775 780	
aca tat gag gaa ctt aag aaa cgt gca gag gaa gca atg aac aag tcc	2400
Thr Tyr Glu Glu Leu Lys Lys Arg Ala Glu Glu Ala Met Asn Lys Ser	
785 790 795 800	



agt ctt gtt ttg tca ctc att aag aaa aac gaa agt aat gta tca aaa	2448
Ser Leu Val Leu Ser Leu Ile Lys Lys Asn Glu Ser Asn Val Ser Lys	
805 810 815	
agt aat agc aaa aac aag gat aag aat gcc gtt tca aac gga ctt caa	2496
Ser Asn Ser Lys Asn Lys Asp Lys Asn Ala Val Ser Asn Gly Leu Gln	
820 825 830	
gat acc aca aaa cat gtg aaa ata cta cgg aga gga gtt aag gat gta	2544
Asp Thr Thr Lys His Val Lys Ile Leu Arg Arg Gly Val Lys Asp Val	
835 840 845	
tcc gta aca gaa tta gaa gct aaa gca ttt gat ttg gca gca gaa gta	2592
Ser Val Thr Glu Leu Glu Ala Lys Ala Phe Asp Leu Ala Ala Glu Val	
850 855 860	
ttt gga aga tat gta gat ttg aag gaa aga tgt aat aaa ttg gaa tca	2640
Phe Gly Arg Tyr Val Asp Leu Lys Glu Arg Cys Asn Lys Leu Glu Ser	
865 870 875 880	
gat tgc aga att aag gag gat tgc aaa gac tta gaa gaa gta tgc aaa	2688
Asp Cys Arg Ile Lys Glu Asp Cys Lys Asp Leu Glu Glu Val Cys Lys	
885 890 895	
aag att aat aag gct tgt cgc aat ctg aag cct ctg gag gtg aag ccg	2736
Lys Ile Asn Lys Ala Cys Arg Asn Leu Lys Pro Leu Glu Val Lys Pro	
900 905 910	
cac gaa aca gtg aca gaa agt aca acg aca act aca aca aca aca aca	2784
His Glu Thr Val Thr Glu Ser Thr Thr Thr Thr Thr Thr Thr Thr	
915 920 925	
acc gtt gcc gat ccg aag gca acg gaa tgc aaa tcc tta cag aca aca	2832
Thr Val Ala Asp Pro Lys Ala Thr Glu Cys Lys Ser Leu Gln Thr Thr	
930 935 940	
gac aca tgg gtt aca cag aca tcg aca cac aca agc acg tct act atc	2880
Asp Thr Trp Val Thr Gln Thr Ser Thr His Thr Ser Thr Ser Thr Ile	
945 950 955 960	
aca tct acc atc aca tca aaa ata aca ttg aca tca acg agg cga tgc	2928
Thr Ser Thr Ile Thr Ser Lys Ile Thr Leu Thr Ser Thr Arg Arg Cys	
965 970 975	
aaa cca acc aag tgt acg aca ggg gat gat gca gaa gac gtg aag cca	2976
Lys Pro Thr Lys Cys Thr Thr Gly Asp Asp Ala Glu Asp Val Lys Pro	
980 985 990	
agt gaa ggc ttg agg gtg agc ggg tgg aat gtg atg agg ggg gtg ata	3024
Ser Glu Gly Leu Arg Val Ser Gly Trp Asn Val Met Arg Gly Val Ile	
995 1000 1005	
gta gca atg gtt att tcg ttc atg att tag	3054
Val Ala Met Val Ile Ser Phe Met Ile	
1010 1015	

&lt;210&gt; 12

&lt;211&gt; 1017

&lt;212&gt; PRT

<213> *Pneumocystis carinii* sp. f. *hominis*



&lt;400&gt; 12

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Asp Glu Val Asn Ile Leu Ala Leu Ile Leu Gln Glu Asp Ala Met Glu  
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Asp Thr Lys Cys Lys Lys Ser Leu Glu Lys Tyr Cys Glu Glu Leu Lys  
 35 40 45

Lys Ala Ser Leu Asp Met Glu Lys Val His Lys Met Leu Lys Asp Phe  
 50 55 60

Cys Gly Asn Gly Lys Ala Ser Lys Ala Asn Thr Lys Cys Gln Gly Leu  
 65 70 75 80

Gln Ala Lys Val Thr Gly Lys Cys Thr Asn Phe Lys Thr Gln Lys Leu  
 85 90 95

Gly Pro Ala Leu Thr Asn Pro Ser Asp Asp Asn Cys Lys Glu Ser Glu  
 100 105 110

Arg Gln Cys Leu Phe Leu Glu Gly Ala Cys His Asn Leu Val Glu Asp  
 115 120 125

Cys Asn Lys Leu Arg Asn Leu Cys Tyr Gln Lys Lys Arg Asp Gly Val  
 130 135 140

Ala Glu Glu Val Leu Leu Arg Ala Leu Arg Ser Asp Leu Asn Lys Thr  
 145 150 155 160

Glu Thr His Glu Lys Lys Leu Lys Glu Ile Cys Pro Val Leu Gln Arg  
 165 170 175

Glu Ser Asn Glu Leu Thr Asp Leu Cys Leu Asn Gln Lys Lys Thr Cys  
 180 185 190

Glu Asn Ile Ile Lys Glu Lys Asp Lys Lys Cys Thr Thr Leu Lys Ala  
 195 200 205

Asn Val Ala Thr Ala Leu Gly Ser Phe Lys Lys Glu Ile Cys Leu Glu  
 210 215 220

Leu Leu Glu Gln Cys Tyr Phe Tyr Ile Gly Asn Cys Gly Asp Asp Asp  
 225 230 235 240

Ile Ile Lys Cys Ile Glu Leu Gly Gly Lys Cys Gln Glu Gln Asn Ile  
 245 250 255

Val Tyr Ile Pro Pro Gly Pro Asp Phe Asp Pro Thr Arg Pro Glu Ala  
 260 265 270

Thr Leu Ala Glu Asp Ile Asp Leu Asp Glu Leu Tyr Lys Lys Ala Glu  
 275 280 285

Glu Asp Gly Val Phe Ile Gly Lys His His Leu Arg Asp Ala Thr Ala  
 290 295 300

Leu Leu Thr Leu Leu Val Lys Lys Asp Asp Thr Gly Lys Asn Asn Asn  
 305 310 315 320



Ile Gly Glu Lys Cys Asn Lys Ile Leu Glu Asp Lys Cys Lys Asn Ser  
 325 330 335  
 Gln Gln His Glu Ala Leu Lys Asn Leu Cys Asn Asn Asn Ser Pro Asn  
 340 345 350  
 Ala Tyr Gly Lys Glu Lys Cys Lys Glu Leu Glu Glu Asp Ile Lys Lys  
 355 360 365  
 Thr Cys Thr Asn Leu Lys Pro Thr Ile Leu Lys Asn His Leu Tyr Asp  
 370 375 380  
 Pro Asn Asp Lys Ile Val Glu Trp Arg Lys Leu Pro Thr Phe Leu Thr  
 385 390 395 400  
 Asn Glu Asp Cys Ala Arg Leu Glu Ser Tyr Cys Phe Tyr Tyr Glu Lys  
 405 410 415  
 Ala Cys Pro Asn Ala Lys Glu Glu Cys Met Asn Leu Arg Ala Ala Cys  
 420 425 430  
 Tyr Lys Arg Gly Leu Asp Gly Arg Ala Asn Lys Val Leu Gln Glu Asn  
 435 440 445  
 Met Arg Gly Leu Leu Arg Gly Ser Asn Gln Ser Trp Leu Lys Glu Phe  
 450 455 460  
 Gln Gln Arg Leu Val Lys Val Cys Lys Glu Leu Lys Glu Asn Lys Gly  
 465 470 475 480  
 Ser Phe Pro Asn Asp Glu Ile Phe Val Leu Cys Val Gln Pro Ala Lys  
 485 490 495  
 Ala Ala Arg Leu Leu Thr His Asp His Gln Met Arg Val Ile Phe Leu  
 500 505 510  
 Arg Gln Gln Leu Asp Gln Lys Arg Asp Phe Pro Thr Asp Lys Asp Cys  
 515 520 525  
 Lys Glu Leu Gly Lys Lys Cys Gln Asp Leu Gly Lys Asp Ser Lys Glu  
 530 535 540  
 Ile Thr Trp Pro Cys His Thr Leu Glu Gln Gln Cys Asn Arg Leu Gly  
 545 550 555 560  
 Thr Thr Glu Ile Leu Lys Gln Val Leu Leu Asp Glu His Lys Asp Thr  
 565 570 575  
 Leu Lys Asp Gln Glu Ser Cys Val Lys Tyr Leu Lys Glu Lys Cys Asn  
 580 585 590  
 Lys Trp Ser Arg Arg Gly Asp Asp Arg Phe Ser Phe Val Cys Val Phe  
 595 600 605  
 Gln Asn Ala Thr Cys Glu Leu Met Val Lys Asp Val Lys Asp Arg Cys  
 610 615 620  
 Glu Val Phe Lys Lys Asn Ile Lys Ala Ser Tyr Ile Ile Glu Phe Leu  
 625 630 635 640



Glu Asn Asn Thr Asn Lys Ile Thr Thr Leu Glu Arg Asn Cys Pro Ser  
 645 650 655  
 Trp His Thr Tyr Cys Asn Arg Phe Ser Pro Asn Cys Pro Gly Leu Thr  
 660 665 670  
 Lys Glu Asn Ser Cys Thr Lys Ile Lys Lys His Cys Glu Pro Phe Tyr  
 675 680 685  
 Lys Arg Lys Ala Leu Glu Asp Ala Leu Lys Val Glu Leu Gln Gly Lys  
 690 695 700  
 Leu Thr Asp Lys Ser Lys Cys Glu Pro Ala Leu Lys Arg Tyr Cys Thr  
 705 710 715 720  
 Val Ala Gly Asn Val Asn Asn Ala Ser Ile Ser Gly Leu Cys Lys Ala  
 725 730 735  
 Asn Thr Lys Asp Asn Ser Gly Lys Ser Asp Glu Asp Ala Arg Lys Glu  
 740 745 750  
 Leu Cys Glu Lys Leu Val Lys Glu Val Glu Glu Gln Cys Lys Ala Leu  
 755 760 765  
 Pro Thr Glu Leu Gly Gln Pro Ala Ala Asp Leu Lys Lys Asp Tyr Lys  
 770 775 780  
 Thr Tyr Glu Glu Leu Lys Lys Arg Ala Glu Glu Ala Met Asn Lys Ser  
 785 790 795 800  
 Ser Leu Val Leu Ser Leu Ile Lys Lys Asn Glu Ser Asn Val Ser Lys  
 805 810 815  
 Ser Asn Ser Lys Asn Lys Asp Lys Asn Ala Val Ser Asn Gly Leu Gln  
 820 825 830  
 Asp Thr Thr Lys His Val Lys Ile Leu Arg Arg Gly Val Lys Asp Val  
 835 840 845  
 Ser Val Thr Glu Leu Glu Ala Lys Ala Phe Asp Leu Ala Ala Glu Val  
 850 855 860  
 Phe Gly Arg Tyr Val Asp Leu Lys Glu Arg Cys Asn Lys Leu Glu Ser  
 865 870 875 880  
 Asp Cys Arg Ile Lys Glu Asp Cys Lys Asp Leu Glu Glu Val Cys Lys  
 885 890 895  
 Lys Ile Asn Lys Ala Cys Arg Asn Leu Lys Pro Leu Glu Val Lys Pro  
 900 905 910  
 His Glu Thr Val Thr Glu Ser Thr Thr Thr Thr Thr Thr Thr Thr  
 915 920 925  
 Thr Val Ala Asp Pro Lys Ala Thr Glu Cys Lys Ser Leu Gln Thr Thr  
 930 935 940  
 Asp Thr Trp Val Thr Gln Thr Ser Thr His Thr Ser Thr Ser Thr Ile  
 945 950 955 960  
 Thr Ser Thr Ile Thr Ser Lys Ile Thr Leu Thr Ser Thr Arg Arg Cys



965

970

975

Lys Pro Thr Lys Cys Thr Thr Gly Asp Asp Ala Glu Asp Val Lys Pro  
 980 985 990

Ser Glu Gly Leu Arg Val Ser Gly Trp Asn Val Met Arg Gly Val Ile  
 995 1000 1005

Val Ala Met Val Ile Ser Phe Met Ile  
 1010 1015

&lt;210&gt; 13

&lt;211&gt; 3072

&lt;212&gt; DNA

<213> *Pneumocystis carinii* sp. f. *hominis*

&lt;220&gt;

&lt;221&gt; CDS

&lt;222&gt; (1)..(3072)

&lt;400&gt; 13

atg gcg cgg gcg gtc aag cgg cag gca gca ggg aca cag aat agc att 48  
 Met Ala Arg Ala Val Lys Arg Gln Ala Ala Gly Thr Gln Asn Ser Ile  
 1 5 10 15

gat gag gaa cat gtt tta gct tta att cta aag gaa gat gga cta agt 96  
 Asp Glu Glu His Val Leu Ala Leu Ile Leu Lys Glu Asp Gly Leu Ser  
 20 25 30

gag cag gaa tgc aaa aaa aaa cta aaa aaa tat tgc caa gaa ttg act 144  
 Glu Gln Glu Cys Lys Lys Lys Leu Lys Lys Tyr Cys Gln Glu Leu Thr  
 35 40 45

gaa gca aaa cta aat ata gaa caa gta cac aga aaa ctt aaa ggt ttt 192  
 Glu Ala Lys Leu Asn Ile Glu Gln Val His Arg Lys Leu Lys Gly Phe  
 50 55 60

tgc gaa gat gga aaa gca gat aca aaa tgc aaa gaa ctg aaa gcc aat 240  
 Cys Glu Asp Gly Lys Ala Asp Thr Lys Cys Lys Glu Leu Lys Ala Asn  
 65 70 75 80

att gag aaa aaa tgt act aca atc aaa gga aaa ctt aaa gaa gca att 288  
 Ile Glu Lys Lys Cys Thr Thr Ile Lys Gly Lys Leu Lys Glu Ala Ile  
 85 90 95

aaa aaa aaa att cag att ata acg gat aag gat tgc aaa gag aat gaa 336  
 Lys Lys Lys Ile Gln Ile Ile Thr Asp Lys Asp Cys Lys Glu Asn Glu  
 100 105 110

caa caa tgc cta ttt ttg gag gga gta tgt tca aaa gaa ctt aaa gat 384  
 Gln Gln Cys Leu Phe Leu Glu Gly Val Cys Ser Lys Glu Leu Lys Asp  
 115 120 125

gat tgc aat act ttg aga aat aag tgc tat caa aag aaa cgt gat aaa 432  
 Asp Cys Asn Thr Leu Arg Asn Lys Cys Tyr Gln Lys Lys Arg Asp Lys  
 130 135 140

gtt gcg gaa gaa gtt ctt tta aga gca ctt cgt agc gat ctt aat gga 480  
 Val Ala Glu Glu Val Leu Leu Arg Ala Leu Arg Ser Asp Leu Asn Gly  
 145 150 155 160

47



tca gtc ata tgt gaa aaa aaa ctt aaa gag att tgc cct gtc atg ggg	528
Ser Val Ile Cys Glu Lys Lys Leu Lys Glu Ile Cys Pro Val Met Gly	
165 170 175	
agg gaa agt gat gag tta aca aac ttg tgt ctg aac cag aaa gag aca	576
Arg Glu Ser Asp Glu Leu Thr Asn Leu Cys Leu Asn Gln Lys Glu Thr	
180 185 190	
tgt aag aat att tta att gaa aaa gat aag aag tgc ggt act ctt aaa	624
Cys Lys Asn Ile Leu Ile Glu Lys Asp Lys Lys Cys Gly Thr Leu Lys	
195 200 205	
aca gat gtt tca gca gca cta gga agt ttt aaa aaa gaa aca tgt ctt	672
Thr Asp Val Ser Ala Ala Leu Gly Ser Phe Lys Lys Glu Thr Cys Leu	
210 215 220	
gaa tta ctc gaa caa tgc tat ttt tac att gga aat tgc gga gac gac	720
Glu Leu Leu Glu Gln Cys Tyr Phe Tyr Ile Gly Asn Cys Gly Asp Asp	
225 230 235 240	
gat ata att aaa tgt att gaa ttg gga gga aaa tgc caa gaa caa aat	768
Asp Ile Ile Lys Cys Ile Glu Leu Gly Gly Lys Cys Gln Glu Gln Asn	
245 250 255	
att gct tat atg cca cca gga ccc gat ttt gat cca act agg cca gag	816
Ile Ala Tyr Met Pro Pro Gly Pro Asp Phe Asp Pro Thr Arg Pro Glu	
260 265 270	
gct aca ata gca gag gat ata ggg ctg gaa gag ttt tat aag aag gta	864
Ala Thr Ile Ala Glu Asp Ile Gly Leu Glu Glu Phe Tyr Lys Lys Val	
275 280 285	
gag gag gat gga gtt ttt att gga aag aat cat cta aga gat gcg aca	912
Glu Glu Asp Gly Val Phe Ile Gly Lys Asn His Leu Arg Asp Ala Thr	
290 295 300	
gct ttg ttg gca ttg ttg atc caa gat tct agt ctt aaa aaa aaa gac	960
Ala Leu Leu Ala Leu Leu Ile Gln Asp Ser Ser Leu Lys Lys Lys Asp	
305 310 315 320	
gac aaa gag aaa tgc gaa gaa gcc ctt caa aaa agc tgc aaa aat cct	1008
Asp Lys Glu Lys Cys Glu Glu Ala Leu Gln Lys Ser Cys Lys Asn Pro	
325 330 335	
cat gaa cat gag gct tta gaa agt tta tgt aag aaa aat ggt tta agt	1056
His Glu His Glu Ala Leu Glu Ser Leu Cys Lys Lys Asn Gly Leu Ser	
340 345 350	
aat gat gga acg aaa aaa tgt gaa gaa ttg caa aat gat att aac aaa	1104
Asn Asp Gly Thr Lys Lys Cys Glu Glu Leu Gln Asn Asp Ile Asn Lys	
355 360 365	
act tgc aaa att ttc act tca aaa gtc act aat aat cgt ctt ttt gat	1152
Thr Cys Lys Ile Phe Thr Ser Lys Val Thr Asn Asn Arg Leu Phe Asp	
370 375 380	
cca aca aaa gga aat aat gaa att gtt gga tgg gaa ggg ttg cca aca	1200
Pro Thr Lys Gly Asn Asn Glu Ile Val Gly Trp Glu Gly Leu Pro Thr	
385 390 395 400	



ttt ctt agc aac gaa gat tgt gcg aaa ttg gag tcc tat tgt ttc tat	1248
Phe Leu Ser Asn Glu Asp Cys Ala Lys Leu Glu Ser Tyr Cys Phe Tyr	
405 410 415	
ttt gaa aaa aaa tgt cca gat gga gaa aat gca tgt aaa aat ata aga	1296
Phe Glu Lys Lys Cys Pro Asp Gly Glu Asn Ala Cys Lys Asn Ile Arg	
420 425 430	
gca aca tgt tac aaa aga gga ctt gat gca cgg gca aat aaa gtg ctg	1344
Ala Thr Cys Tyr Lys Arg Gly Leu Asp Ala Arg Ala Asn Lys Val Leu	
435 440 445	
caa gaa aat atg cga gga atg tta cat ggt tca aac aaa agc tgg ctt	1392
Gln Glu Asn Met Arg Gly Met Leu His Gly Ser Asn Lys Ser Trp Leu	
450 455 460	
gaa aag ttt caa caa gaa tta gta aaa gta tgt gag aaa ctg aaa aaa	1440
Glu Lys Phe Gln Gln Glu Leu Val Lys Val Cys Glu Lys Leu Lys Lys	
465 470 475 480	
gaa aac aaa gga agt ttc tca aac gat gaa tta ttt att ctg tgt gta	1488
Glu Asn Lys Gly Ser Phe Ser Asn Asp Glu Leu Phe Ile Leu Cys Val	
485 490 495	
cag cca gca aaa gca gcc cgg ttg ctt aca cat gat ctt cga atg aaa	1536
Gln Pro Ala Lys Ala Ala Arg Leu Leu Thr His Asp Leu Arg Met Lys	
500 505 510	
act atc ttt tta cga caa caa ctg gat caa aag cga gat ttc ccg aca	1584
Thr Ile Phe Leu Arg Gln Gln Leu Asp Gln Lys Arg Asp Phe Pro Thr	
515 520 525	
gat aaa aat tgc aag gaa ttg ggg aga aag tgc caa gat tta gga gag	1632
Asp Lys Asn Cys Lys Glu Leu Gly Arg Lys Cys Gln Asp Leu Gly Glu	
530 535 540	
gat tca aaa gaa att aca tgg cca tgt cat aca ctg gag cag caa tgc	1680
Asp Ser Lys Glu Ile Thr Trp Pro Cys His Thr Leu Glu Gln Gln Cys	
545 550 555 560	
aat cgc ttg ggg act aca gaa att tta aag cag gtt tta ttg gat gaa	1728
Asn Arg Leu Gly Thr Thr Glu Ile Leu Lys Gln Val Leu Leu Asp Glu	
565 570 575	
cac aaa gat act ttg aaa gac caa gaa agt tgt gta aaa tac cta aaa	1776
His Lys Asp Thr Leu Lys Asp Gln Glu Ser Cys Val Lys Tyr Leu Lys	
580 585 590	
gaa aag tgt aat aaa tgg tct aga aga gga gat gac cgt ttc tct ttt	1824
Glu Lys Cys Asn Lys Trp Ser Arg Arg Gly Asp Asp Arg Phe Ser Phe	
595 600 605	
gta tgt gtc ttc caa aac gct acg tgt gag ctg atg gta aaa gac gtg	1872
Val Cys Val Phe Gln Asn Ala Thr Cys Glu Leu Met Val Lys Asp Val	
610 615 620	
aaa gac agg tgt gaa gta ttc aaa aaa aat ata aaa gct tca tat att	1920
Lys Asp Arg Cys Glu Val Phe Lys Lys Asn Ile Lys Ala Ser Tyr Ile	
625 630 635 640	
att gaa ttt ctt gaa aat aat aca aat aaa ata aca aca ctg gaa aga	1968



Ile Glu Phe Leu Glu Asn Asn Thr Asn Lys Ile Thr Thr Leu Glu Arg	
645 650 655	
aat tgt ccc tct tgg cat acg tat tgc aat aga ttt tca cct aat tgt	2016
Asn Cys Pro Ser Trp His Thr Tyr Cys Asn Arg Phe Ser Pro Asn Cys	
660 665 670	
cca ggt ctt acg aaa gag aat agt tgt aca aaa atc aag aag cat cgt	2064
Pro Gly Leu Thr Lys Glu Asn Ser Cys Thr Lys Ile Lys Lys His Arg	
675 680 685	
gag ccg ttc tat aaa aga aag gcc ttg gaa gat gct ctc aaa gta gag	2112
Glu Pro Phe Tyr Lys Arg Lys Ala Leu Glu Asp Ala Leu Lys Val Glu	
690 695 700	
ctt caa gga aaa ttg act gat aaa tct aaa tgt gaa cct gca ttg aaa	2160
Leu Gln Gly Lys Leu Thr Asp Lys Ser Lys Cys Glu Pro Ala Leu Lys	
705 710 715 720	
aga tat tgt aca gta gcg gga aac gta aat aat gcg tca atc agt ggc	2208
Arg Tyr Cys Thr Val Ala Gly Asn Val Asn Asn Ala Ser Ile Ser Gly	
725 730 735	
tta tgc aaa gct aac acc aag gat aac tct gga aag agt gat gag gat	2256
Leu Cys Lys Ala Asn Thr Lys Asp Asn Ser Gly Lys Ser Asp Glu Asp	
740 745 750	
gct aga aag gaa ctc tgt gag aaa tta gtg aaa gaa gtg gaa gaa cag	2304
Ala Arg Lys Glu Leu Cys Glu Lys Leu Val Lys Glu Val Glu Glu Gln	
755 760 765	
tgc aaa gca tta cca aca gaa tta gga caa ccg gca gct gat cta aaa	2352
Cys Lys Ala Leu Pro Thr Glu Leu Gly Gln Pro Ala Ala Asp Leu Lys	
770 775 780	
aaa gat tat aag aca tat gag gaa ctt aag aaa cgt gca gag gaa gca	2400
Lys Asp Tyr Lys Thr Tyr Glu Glu Leu Lys Lys Arg Ala Glu Glu Ala	
785 790 795 800	
atg aac aag tcc agt ctt gtt ttg tca ctc att aag aaa aac gaa agt	2448
Met Asn Lys Ser Ser Leu Val Leu Ser Leu Ile Lys Lys Asn Glu Ser	
805 810 815	
aat gta tca aaa agt aat agc aaa aac aag gat aag aat gcc gtt tca	2496
Asn Val Ser Lys Ser Asn Ser Lys Asn Lys Asp Lys Asn Ala Val Ser	
820 825 830	
aac gga ctt caa gat acc aca aaa cat gtg aaa ata cta cgg agg gga	2544
Asn Gly Leu Gln Asp Thr Thr Lys His Val Lys Ile Leu Arg Arg Gly	
835 840 845	
gtt aag gat gta tcc gta aca gaa tta gaa gct aaa gca ttt gat ttg	2592
Val Lys Asp Val Ser Val Thr Glu Leu Glu Ala Lys Ala Phe Asp Leu	
850 855 860	
gca gca gaa gta ttt gga aga tat gta gat ttg aag gaa aga tgt aat	2640
Ala Ala Glu Val Phe Gly Arg Tyr Val Asp Leu Lys Glu Arg Cys Asn	
865 870 875 880	
aaa ttg gaa tca gat tgc aga att aag gag gat tgc aaa gac tta gaa	2688
Lys Leu Glu Ser Asp Cys Arg Ile Lys Glu Asp Cys Lys Asp Leu Glu	



885										890					895					
gaa gta tgc aaa aag att aat aag gct tgt cgc aat ctg aag cct ctg	2736																			
Glu Val Cys Lys Lys Ile Asn Lys Ala Cys Arg Asn Leu Lys Pro Leu																				
900 905 910																				
gag gtg aag ccg cac gaa aca gtg aca gaa agt aca acg aca act aca	2784																			
Glu Val Lys Pro His Glu Thr Val Thr Glu Ser Thr Thr Thr Thr																				
915 920 925																				
aca aca aca aca acc gtt gcc gat ccg aag gca acg gaa tgc aaa tcc	2832																			
Thr Thr Thr Thr Thr Val Ala Asp Pro Lys Ala Thr Glu Cys Lys Ser																				
930 935 940																				
tta cag aca aca gac aca tgg gtt aca cag aca tcg aca cac aca agc	2880																			
Leu Gln Thr Thr Asp Thr Trp Val Thr Gln Thr Ser Thr His Thr Ser																				
945 950 955 960																				
acg tct act atc aca tct acc atc aca tca aaa ata aca ttg aca tca	2928																			
Thr Ser Thr Ile Thr Ser Thr Ile Thr Ser Lys Ile Thr Leu Thr Ser																				
965 970 975																				
acg agg cga tgc aaa cca acc aag tgt acg aca gga gag gaa gat gat	2976																			
Thr Arg Arg Cys Lys Pro Thr Lys Cys Thr Thr Gly Glu Glu Asp Asp																				
980 985 990																				
gca gga gac gtg aaa ccg agt gag ggg ctg agg atg agt ggg tgg aat	3024																			
Ala Gly Asp Val Lys Pro Ser Glu Gly Leu Arg Met Ser Gly Trp Asn																				
995 1000 1005																				
gtg atg agg ggg gtg ata gta gca atg gtt att tcg ttc atg att tag	3072																			
Val Met Arg Gly Val Ile Val Ala Met Val Ile Ser Phe Met Ile																				
1010 1015 1020																				

&lt;210&gt; 14

&lt;211&gt; 1023

&lt;212&gt; PRT

<213> *Pneumocystis carinii* sp. f. *hominis*

&lt;400&gt; 14

Met	Ala	Arg	Ala	Val	Lys	Arg	Gln	Ala	Ala	Gly	Thr	Gln	Asn	Ser	Ile
1				5					10					15	

Asp	Glu	Glu	His	Val	Leu	Ala	Leu	Ile	Leu	Lys	Glu	Asp	Gly	Leu	Ser
			20					25					30		

Glu	Gln	Glu	Cys	Lys	Lys	Lys	Leu	Lys	Lys	Tyr	Cys	Gln	Glu	Leu	Thr
			35				40					45			

Glu	Ala	Lys	Leu	Asn	Ile	Glu	Gln	Val	His	Arg	Lys	Leu	Lys	Gly	Phe
	50					55					60				

Cys	Glu	Asp	Gly	Lys	Ala	Asp	Thr	Lys	Cys	Lys	Glu	Leu	Lys	Ala	Asn
65				70						75				80	

Ile	Glu	Lys	Lys	Cys	Thr	Thr	Ile	Lys	Gly	Lys	Leu	Lys	Glu	Ala	Ile
				85					90					95	

Lys	Lys	Lys	Ile	Gln	Ile	Ile	Thr	Asp	Lys	Asp	Cys	Lys	Glu	Asn	Glu
			100					105					110		



Gln Gln Cys Leu Phe Leu Glu Gly Val Cys Ser Lys Glu Leu Lys Asp  
 115 120 125  
 Asp Cys Asn Thr Leu Arg Asn Lys Cys Tyr Gln Lys Lys Arg Asp Lys  
 130 135 140  
 Val Ala Glu Glu Val Leu Leu Arg Ala Leu Arg Ser Asp Leu Asn Gly  
 145 150 155 160  
 Ser Val Ile Cys Glu Lys Lys Leu Lys Glu Ile Cys Pro Val Met Gly  
 165 170 175  
 Arg Glu Ser Asp Glu Leu Thr Asn Leu Cys Leu Asn Gln Lys Glu Thr  
 180 185 190  
 Cys Lys Asn Ile Leu Ile Glu Lys Asp Lys Lys Cys Gly Thr Leu Lys  
 195 200 205  
 Thr Asp Val Ser Ala Ala Leu Gly Ser Phe Lys Lys Glu Thr Cys Leu  
 210 215 220  
 Glu Leu Leu Glu Gln Cys Tyr Phe Tyr Ile Gly Asn Cys Gly Asp Asp  
 225 230 235 240  
 Asp Ile Ile Lys Cys Ile Glu Leu Gly Gly Lys Cys Gln Glu Gln Asn  
 245 250 255  
 Ile Ala Tyr Met Pro Pro Gly Pro Asp Phe Asp Pro Thr Arg Pro Glu  
 260 265 270  
 Ala Thr Ile Ala Glu Asp Ile Gly Leu Glu Glu Phe Tyr Lys Lys Val  
 275 280 285  
 Glu Glu Asp Gly Val Phe Ile Gly Lys Asn His Leu Arg Asp Ala Thr  
 290 295 300  
 Ala Leu Leu Ala Leu Leu Ile Gln Asp Ser Ser Leu Lys Lys Lys Asp  
 305 310 315 320  
 Asp Lys Glu Lys Cys Glu Glu Ala Leu Gln Lys Ser Cys Lys Asn Pro  
 325 330 335  
 His Glu His Glu Ala Leu Glu Ser Leu Cys Lys Lys Asn Gly Leu Ser  
 340 345 350  
 Asn Asp Gly Thr Lys Lys Cys Glu Glu Leu Gln Asn Asp Ile Asn Lys  
 355 360 365  
 Thr Cys Lys Ile Phe Thr Ser Lys Val Thr Asn Asn Arg Leu Phe Asp  
 370 375 380  
 Pro Thr Lys Gly Asn Asn Glu Ile Val Gly Trp Glu Gly Leu Pro Thr  
 385 390 395 400  
 Phe Leu Ser Asn Glu Asp Cys Ala Lys Leu Glu Ser Tyr Cys Phe Tyr  
 405 410 415  
 Phe Glu Lys Lys Cys Pro Asp Gly Glu Asn Ala Cys Lys Asn Ile Arg  
 420 425 430



Ala Thr Cys Tyr Lys Arg Gly Leu Asp Ala Arg Ala Asn Lys Val Leu  
 435 440 445  
 Gln Glu Asn Met Arg Gly Met Leu His Gly Ser Asn Lys Ser Trp Leu  
 450 455 460  
 Glu Lys Phe Gln Gln Glu Leu Val Lys Val Cys Glu Lys Leu Lys Lys  
 465 470 475 480  
 Glu Asn Lys Gly Ser Phe Ser Asn Asp Glu Leu Phe Ile Leu Cys Val  
 485 490 495  
 Gln Pro Ala Lys Ala Ala Arg Leu Leu Thr His Asp Leu Arg Met Lys  
 500 505 510  
 Thr Ile Phe Leu Arg Gln Gln Leu Asp Gln Lys Arg Asp Phe Pro Thr  
 515 520 525  
 Asp Lys Asn Cys Lys Glu Leu Gly Arg Lys Cys Gln Asp Leu Gly Glu  
 530 535 540  
 Asp Ser Lys Glu Ile Thr Trp Pro Cys His Thr Leu Glu Gln Gln Cys  
 545 550 555 560  
 Asn Arg Leu Gly Thr Thr Glu Ile Leu Lys Gln Val Leu Leu Asp Glu  
 565 570 575  
 His Lys Asp Thr Leu Lys Asp Gln Glu Ser Cys Val Lys Tyr Leu Lys  
 580 585 590  
 Glu Lys Cys Asn Lys Trp Ser Arg Arg Gly Asp Asp Arg Phe Ser Phe  
 595 600 605  
 Val Cys Val Phe Gln Asn Ala Thr Cys Glu Leu Met Val Lys Asp Val  
 610 615 620  
 Lys Asp Arg Cys Glu Val Phe Lys Lys Asn Ile Lys Ala Ser Tyr Ile  
 625 630 635 640  
 Ile Glu Phe Leu Glu Asn Asn Thr Asn Lys Ile Thr Thr Leu Glu Arg  
 645 650 655  
 Asn Cys Pro Ser Trp His Thr Tyr Cys Asn Arg Phe Ser Pro Asn Cys  
 660 665 670  
 Pro Gly Leu Thr Lys Glu Asn Ser Cys Thr Lys Ile Lys Lys His Arg  
 675 680 685  
 Glu Pro Phe Tyr Lys Arg Lys Ala Leu Glu Asp Ala Leu Lys Val Glu  
 690 695 700  
 Leu Gln Gly Lys Leu Thr Asp Lys Ser Lys Cys Glu Pro Ala Leu Lys  
 705 710 715 720  
 Arg Tyr Cys Thr Val Ala Gly Asn Val Asn Asn Ala Ser Ile Ser Gly  
 725 730 735  
 Leu Cys Lys Ala Asn Thr Lys Asp Asn Ser Gly Lys Ser Asp Glu Asp  
 740 745 750  
 Ala Arg Lys Glu Leu Cys Glu Lys Leu Val Lys Glu Val Glu Glu Gln  
 53



755

760

765

Cys Lys Ala Leu Pro Thr Glu Leu Gly Gln Pro Ala Ala Asp Leu Lys  
 770 775 780  
 Lys Asp Tyr Lys Thr Tyr Glu Glu Leu Lys Lys Arg Ala Glu Glu Ala  
 785 790 795 800  
 Met Asn Lys Ser Ser Leu Val Leu Ser Leu Ile Lys Lys Asn Glu Ser  
 805 810 815  
 Asn Val Ser Lys Ser Asn Ser Lys Asn Lys Asp Lys Asn Ala Val Ser  
 820 825 830  
 Asn Gly Leu Gln Asp Thr Thr Lys His Val Lys Ile Leu Arg Arg Gly  
 835 840 845  
 Val Lys Asp Val Ser Val Thr Glu Leu Glu Ala Lys Ala Phe Asp Leu  
 850 855 860  
 Ala Ala Glu Val Phe Gly Arg Tyr Val Asp Leu Lys Glu Arg Cys Asn  
 865 870 875 880  
 Lys Leu Glu Ser Asp Cys Arg Ile Lys Glu Asp Cys Lys Asp Leu Glu  
 885 890 895  
 Glu Val Cys Lys Lys Ile Asn Lys Ala Cys Arg Asn Leu Lys Pro Leu  
 900 905 910  
 Glu Val Lys Pro His Glu Thr Val Thr Glu Ser Thr Thr Thr Thr Thr  
 915 920 925  
 Thr Thr Thr Thr Thr Val Ala Asp Pro Lys Ala Thr Glu Cys Lys Ser  
 930 935 940  
 Leu Gln Thr Thr Asp Thr Trp Val Thr Gln Thr Ser Thr His Thr Ser  
 945 950 955 960  
 Thr Ser Thr Ile Thr Ser Thr Ile Thr Ser Lys Ile Thr Leu Thr Ser  
 965 970 975  
 Thr Arg Arg Cys Lys Pro Thr Lys Cys Thr Thr Gly Glu Glu Asp Asp  
 980 985 990  
 Ala Gly Asp Val Lys Pro Ser Glu Gly Leu Arg Met Ser Gly Trp Asn  
 995 1000 1005  
 Val Met Arg Gly Val Ile Val Ala Met Val Ile Ser Phe Met Ile  
 1010 1015 1020

&lt;210&gt; 15

&lt;211&gt; 249

&lt;212&gt; DNA

<213> *Pneumocystis carinii* sp. f. *hominis*

&lt;220&gt;

&lt;221&gt; CDS

&lt;222&gt; (1)..(249)

&lt;400&gt; 15



gag tgc caa tct ctg cag acg aca gac acg tgg gtc aca aag acg tcg 48  
 Glu Cys Gln Ser Leu Gln Thr Thr Asp Thr Trp Val Thr Lys Thr Ser  
 1 5 10 15  
 acc cat act agc act tct acg act acg tcc aca gtc aca tcg aga ata 96  
 Thr His Thr Ser Thr Ser Thr Thr Thr Ser Thr Val Thr Ser Arg Ile  
 20 25 30  
 aca ctc acc tca acg agg cgg tgt aag cct acg aag tgt acg aca gga 144  
 Thr Leu Thr Ser Thr Arg Arg Cys Lys Pro Thr Lys Cys Thr Thr Gly  
 35 40 45  
 gag gaa gat gat gca gga gag gtg aag ccg agt gaa ggg ctg agg atg 192  
 Glu Glu Asp Asp Ala Gly Glu Val Lys Pro Ser Glu Gly Leu Arg Met  
 50 55 60  
 agt ggg tgg agt gtg atg agg ggg gtg tta tta gca atg atg att tca 240  
 Ser Gly Trp Ser Val Met Arg Gly Val Leu Leu Ala Met Met Ile Ser  
 65 70 75 80  
 ttc atg att 249  
 Phe Met Ile

<210> 16  
 <211> 83  
 <212> PRT  
 <213> *Pneumocystis carinii* sp. f. *hominis*

<400> 16  
 Glu Cys Gln Ser Leu Gln Thr Thr Asp Thr Trp Val Thr Lys Thr Ser  
 1 5 10 15  
 Thr His Thr Ser Thr Ser Thr Thr Thr Ser Thr Val Thr Ser Arg Ile  
 20 25 30  
 Thr Leu Thr Ser Thr Arg Arg Cys Lys Pro Thr Lys Cys Thr Thr Gly  
 35 40 45  
 Glu Glu Asp Asp Ala Gly Glu Val Lys Pro Ser Glu Gly Leu Arg Met  
 50 55 60  
 Ser Gly Trp Ser Val Met Arg Gly Val Leu Leu Ala Met Met Ile Ser  
 65 70 75 80  
 Phe Met Ile

<210> 17  
 <211> 25  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: synthetic  
 oligonucleotide

<400> 17  
 gaatgcaaat ccttacagac aacag 25



<210> 18  
<211> 25  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: synthetic  
oligonucleotide

<400> 18  
gaatgcaaat ctttacagac aacag

25

<210> 19  
<211> 26  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: synthetic  
oligonucleotide

<400> 19  
tgcaaaccac ccaagtgtac gacagg

26

<210> 20  
<211> 25  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: synthetic  
oligonucleotide

<400> 20  
aaatcatgaa cgaaataacc attgc

25

<210> 21  
<211> 30  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: synthetic  
oligonucleotide

<400> 21  
tttcatatgg cgcgggcggt caagcggcag

30

<210> 22  
<211> 30  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: synthetic  
oligonucleotide



<400> 22  
ctaaatcatg aacgaaataa ccattgctac

30

<210> 23  
<211> 24  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: synthetic  
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Leu Leu Glu Lys Ile Met  
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1 5 10 15